



HELSINKI UNIVERSITY OF TECHNOLOGY

Faculty of Electronics, Communications, and Automation

Department of Communications and Networking

Ran He

E-leadership Strategy in Virtual Organizations and Virtual Teams

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Supervisor: Professor Timo O. Korhonen

**Author:** Ran He**Title:** E-leadership Strategy in Virtual Organizations and Virtual Teams**Number of pages:** 98 p.**Date:** 17th September 2008**Faculty:** Faculty of Electronics, Communications, and Automation**Chair:** S-38 Networking Technology**Supervisor:** Professor Timo O. Korhonen**Abstract**

In accordance with the globalization of trade and business, a new paradigm of work pattern known as Virtual Organization (VO) emerged in 1990s. VO particularly removes time and location barriers but links companies via ICTs which enable them to collaborate on a worldwide scale. While at same time being engaged in collaboration, VO partners have been increasingly relying on Virtual Team (VT) to fulfill designated tasks or projects, in which interaction and collaboration takes place among geographically distributed and often culturally disparate individuals.

This study focuses on e-leadership strategies, which basically refers to how to effectively and strategically lead VT members that are geographically dispersed. Clearly, leadership and relationship in VOs or VTs can prove challenging to build or sustain in virtual context where trust is difficult to build, influence is hard to articulate, and communication is often ambiguous. Among a range of e-leadership challenges inherent to the dispersed and often impersonal nature, technology, communication, cultural differences, trust, and logistics are the typical issues, thus will be addressed in this study.

This study aims to investigate the transition from traditional management to e-leadership in VOs or VTs; additionally, in order to establish a theoretical framework of leadership in VOs, this study will synthesize the leadership theories and models on the basis of literature reviews. The experimental study focuses on NRC (Nokia Research Center) and Talentor (Talentor Group Oy), which are representative in technology and business fields respectively. By conducting interview and survey as the methodologies, this study will explore how VOs and VTs are operated as well as how to improve the effectiveness of e-leadership.

Keywords: VO, VT, e-leadership, strategy, effectiveness, e-leader, conflict**Language:** English

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ACRONYMS

CMCS	Computer Mediated Communication Systems
HR	Human Resource
ICT	Information Communication Technology
KM	Knowledge Management
LPC	Least Preferred Co-Worker
R&D	Research and Development
RDF	Resource Description Framework
URI	Uniform Resource Identifier
VO	Virtual Organization
VT	Virtual Team
W3C	World Wide Web Consortium

KEY CONCEPTS

Computer Mediated Communication Systems (CMCS)

- CMCS has become an important and widely-used tool in many organizations, and is being used increasingly as a method for communication within professional and social groups (Kayworth & Leidner 2000). The term is used to refer to a wide variety of communications systems, ranging from electronic mail over corporate local area networks to the international scholarly conferences distributed over the Internet.

Collaboration

- Collaboration is a process defined by the recursive interaction of knowledge and mutual learning between two or more companies or individuals who are working together, in an intellectual endeavor, toward a common goal which is typically creative in nature. As a result, people work across organizational boundaries and provide the infrastructure for independent firms across the globe to function together as if they were a single company (Handy 1995).

Conflict Management

- Conflict management refers to the long-term management of intractable conflicts. It is the label for the variety of ways by which people handle grievances. Leaders can examine their team diversity to identify potential fault lines from their inceptions so that they can steadily evolve mechanisms and norms to deal with such differences or grievances (Kankanhalli et al 2007).

E-leadership

- Without deviating from traditional leadership, e-leadership also aims to create and distribute the organizational vision, glue corporations or individuals together, as well as direct and supervise the execution of the plans (Avolio & Kahai 2003). The fundamental difference nevertheless is that e-leadership takes shape in the virtual context where collaboration and leader-follower interaction are mediated by ICTs.

Followership

- Followership basically refers to the act or condition of following a leader. The leader-follower relationship exists in all nations, cultures, and organizations (Bennis & Thomas 2002). As long as the leader nurtures and fosters cohesiveness and trust within this relationship, the follower will continue to acquiesce power for the good of the goal, organization, or even to just maintain that leader-follower relationship.

Information Communication Technology (ICT)

- ICT is an umbrella term that includes all technologies for the manipulation and communication of information. It includes the wide variety of computing hardware as well as the full gamut of application software (Pauleen 2003).

Knowledge Management (KM)

- KM is a process that deals with the development, storage, retrieval, and dissemination of information and expertise within an organization to support and improve its business performance (Gupta et al 2000). Essentially, it embodies organizational processes that seek synergistic combination of data and information processing capacity of information technologies, and the creative and innovative capacity of human beings (Malhotra 1997).

Virtual Organization (VO)

- VO is a geographically distributed organization whose members are bound by a long-term common interest or goal, and who communicate and coordinate their work through information technology (Ahuja & Carley 1998). It particularly removes time and location barriers but links corporations via ICTs that enable them to collaborate on a worldwide scale.

Virtual Team (VT)

- VTs are commonly adopted as a maneuver to cut the budgets of travel, relocation, real estate, or other business activities. VT is used by VO partners to fulfill designated task or project, in which interaction and collaboration take place among geographically distributed and often culturally disparate individuals (Balthazard et al, 2004). These selected VT members are committed to a common purpose and should have interdependent performance goals and share an approach to work for which they hold themselves mutually accountable.

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1 INTRODUCTION

Throughout the last two decades, a remarkable revolution has been taking shape in organizations across the globe. This revolution involves the wiring of corporations so that various aspects of human interactions are now mediated by diverse ICTs (Information and Communication Technologies). As a result, a large number of traditional vertically-aligned organizations have been shifting to a more flexible and versatile structure to meet the demands of the rapidly changing marketplaces.

This new organizational structure is introduced as VO (Virtual Organization), which particularly removes time and location barriers but links corporations via ICTs that enable them to collaborate on a worldwide scale. While being engaged in collaboration, VO partners have been increasingly relying on VTs (Virtual Teams) to fulfill designated tasks or projects, in which interaction and collaboration take place among geographically distributed and often culturally disparate individuals. These teams are able to perform their work without concern of space or time constraints since they adopt the technology richness to coordinate their activities and share all the resources needed.

However, the implementation of VOs and VTs poses significant challenges for organizations that wish to deploy them. Although many of these challenges are present in traditional teams, they may become even more critical in virtual settings. One such challenge is e-leadership, which basically refers to how to effectively lead VT members that are geographically dispersed through a set of leadership strategies.

In accordance with traditional teams, leader also plays a critical role in VOs and VTs by prompting followers' consistency and cohesion as well as their motivation to contribute to the specific task. Nevertheless, due to the lack of physical proximity, the virtual world requires e-leaders to be proactive and interactive with followers and to alter the effort and strategies for building motivation and relationships. Evidently, if being strategically leaded, the team-based organizations can optimize resource sharing, stimulate high creativity and innovation, efficiently solve the emergent problems, and prompt favorable quality decisions.

Although there is an abundance of studies and researches to explain leadership theory in traditional team settings, little empirical work examined e-leadership or posited relevant

strategies in virtual context. The objective of this study thus is to address this gap through investigating e-leadership effectiveness and strategies. The following research questions summarize this effort:

- What are the key concepts of VOs?
- How does e-leadership differ from traditional leadership?
- What factors contribute to effective leadership in virtual environment?
- What major challenges have e-leadership been embracing?
- How to strategically address these challenges?
- How to manage and alleviate VT conflicts?

Clearly, leadership and relationship can prove challenging to build or sustain in virtual context where trust is difficult to build, influence is hard to articulate, and communication is often ambiguous. Among a range of e-leadership challenges inherent to the dispersed and often impersonal nature, technology, communication, cultural differences, trust, and logistics are the typical issues. Without addressing these challenges before moving forward, e-leadership and VOs can be problematic and fragile.

This study aims to investigate the transition from traditional management to e-leadership in VOs or VTs; additionally, in order to establish a theoretical framework of leadership in VOs, this study will synthesize the leadership theories and models on the basis of literature reviews. The experimental study focuses on NRC (Nokia Research Center) and Talentor (Talentor Group Oy), which are representative in technology and business fields respectively. By conducting interview and survey as the methodologies, this study will explore how VOs and VTs are operated as well as how to improve the effectiveness of e-leadership.

The rest of this thesis is organized as follows. Chapter 2 introduces an overview of VO along with its key concepts, including technology tools, knowledge management, and VT. In Chapter 3, we compare leadership with traditional management and followership, as well as synthesize the leadership theories and models. The experimental study starts from Chapters 4. Chapter 4 introduces the background information of two involved companies and explains the methodology of this study. The current status and conditions of e-leadership in these two companies will be assessed in Chapter 5. Chapter 6 investigates the VT conflict attributions and resolution approaches, as well as

elicits the conflict managerial strategies. In the last chapter, Chapter 7, we will conclude our findings, discuss the limitation of this study, and suggest the future study.

2 VIRTUAL ORGANIZATION LANDSCAPE

In accordance with the globalization of trade and business, a new paradigm of work pattern known as VO emerged in 1990s. Ahuja and Carley (1998) formulated this entrant as “a geographically distributed organization whose members are bound by a long-term common interest or goal, and who communicate and coordinate their work through information technology”.

VO has evidently become a subject of significant interest as the 21st century dawns. It particularly removes time and location barriers so that the virtual workplace where employees can operate remotely from each other becomes a reality now, and all indications allude that it will be even more prevalent in the future. VOs stress the new services and products bound with intensive information and knowledge characteristics, rather than cost saving attributed to virtual settings. Cooper and Rousseau (1999) thus posited VO is a viable means of organizing which has produced substantial company and individual benefits. This chapter will provide a vivid landscape of virtual world by exploring the definitions and key concepts of VOs.

2.1 VOs: significant organizational trend

Traditionally, organizations or corporations usually vertically integrated work in a pyramidal and hierarchical structure. This typical centralized managerial hierarchy controlled the entire production process and activities from raw material purchase to customer aftersales service, with white collars establishing rules and procedures to manage the blue-collar workforce. However, in today's business environment, organizations have been facing changes with great rapidity, which increasingly enhances the level of uncertainty, instability, turbulence, and insecurity. As a result, solitary corporation has been encumbered with inflexibility and inagility as well as incapable of promptly processing information throughout the whole corporation or organization.

These faltering corporations started to realize only through coordination, cooperation, and collaboration could they sail cohesively through muddy waters. Accordingly, they have underpinned the necessity of shifting to the new VO structure as an indispensable strategy to unprecedented customer expectations and alternatives, global competition, time compression, complexity, rapid change, and increased use of technology.

As an organizational metaphor, the virtual concept is “a product of the Information Age generally and the computer industry in particular” (Cooper & Rousseau 1999). As the consequence of ICT evolvments, workplace, working time, and even the communication medium have been under remarkable revolutions. Nowadays, teamwork is seamless as it moves between home and office but also endless as it rolls along a whole day. Furthermore, aiming at optimization of business progress, VO partners complement each other and collaboratively implement a project, conducing to the pooling of expert resources and specialized knowledge.

Nevertheless, VO requires a different way of perceiving the world for those participants who share risks, costs, and rewards in pursuit of a global market. Additionally, VO can only occur if the participants bear a different mindset from the traditional perspectives on the formality, proximity, and functions of relationships (Preston 1999). Those distinguishing traits featured VOs can be grouped under six headings as follows:

- *Interdependence.* The concept of interdependence involves the cooperation and synergy between participants in a VO. While sharing skills and information, each partner devotes its own contribution to common goal of customer fulfillment (Cooper & Rousseau 1999), resulting in greater equality in participant relationship.
- *Permeable boundaries.* Strong interdependence among participants renders organizational boundaries blurred since competitors, suppliers, and customers enter into cooperative agreements.
- *ICT utilization.* With ICT evolvement, virtual office now can use desktop videoconferencing, collaborative software, and intranet systems to enhance the flow of information among team members. As a result, employees can reach one another between geographically dispersed locations.
- *Geographical dispersion.* Thanks to ICTs as primary communication means, work location is no longer of significance. Innovative technologies have enabled the corporations to collaborate independently of place or time, and provided connectivity between each other.
- *Dissolvable alliance.* A VO represents the alignment among those partners who aim at a common goal. Naturally, once the objective has been fulfilled or the

opportunity has been exploited, partners may dissolve the synergy and move on to new partnerships and alliances.

- *Resources pooling and knowledge sharing.* Participants within a VO complement each other by pooling, sharing, and reallocating the resources since they have realized their strong dependence on one another and the continued participation in the network also necessitates this sharing.

2.2 Technology Tools of VOs

The information revolution has substantially changed the way people conduct business by allowing transmission of any information across vast distances in little time and at little expense. This significant change facilitated the debut of VO on the organization arena, where employees work at different locations can communicate with each other by various technology tools in order to cooperate and collaborate toward a common objective.

Focusing on these efficient technology tools, Kimball (1997) formulated a two dimensional taxonomic scheme to differentiate groupware technologies in terms of their abilities to bridge time and space. Table 1 illustrates the communication mode matrix which is categorized along time and place.

Table 1. Matrix of technology tools

(Source: Kimball 1997; Fernández 2007)

	Same Time (synchronous)	Different Time (asynchronous)
Same Place (co-located)	Face-to-face meetings Computer-supported meetings	Library (resource center) "War" room
Different Place (distributed)	Audio (telephone) conferencing Video conferencing	Voice mail Electronic mail Computer conferencing Groupware (Intranets)

In addition, Fernández (2007) delineated groupware from the perspective of

collaboration level. She divided the groupware into communication tools, conferencing tools, and management tools, which are shown in Table 2 along with the respective definition and function.

Table 2. Categories of collaboration tools

(Source: Fernández 2007)

Category	Primary Function	Examples
Communication Tools	End-user asynchronous tools that facilitate the sharing of information by sending messages, files, data, documents, etc.	<ul style="list-style-type: none"> • E-mail • Internet forums • Discussion boards • Wikis • Weblogs • RSS • Social networking • Web services • Social bookmarking
Conferencing Tools	End-user real-time tools that facilitate interactive communication	<ul style="list-style-type: none"> • Online chat and instant messaging • Flash Meeting • Video • Online whiteboards or data conferencing • conferencing
Management Tools	Facilitate and manage group activities	<ul style="list-style-type: none"> • Meeting scheduling tools and team calendars • Mind map • Application/desktop sharing • Contact management/address books • Task lists • File and documents sharing • Awareness utilities • Workflow management support • Intranet • Extranet

Those collaboration tools listed in Table 2 are currently thriving and omnipresent in VOs. Nevertheless, organizations have been continually seeking alternative means to optimize KM (Knowledge Management) and to stimulate innovation within or across geographical boundaries. Most significantly, Semantic Web, as a newcomer, has attracted organizations by its distinct features on KM and thus become a veritable wave. Semantic Web systematically structures the data in order to easily retrieve the information, thus greatly facilitating KM systems inside VOs. The next section will continue to explore the effectiveness of Semantic Web from KM perspective.

2.3 Knowledge Management

As a product of power relations, knowledge comprises information, communication, human resources, intellectual capital, brands, etc. (Quintas et al 1997) During the past decade, knowledge capital of a company has been widely acknowledged as a pivotal resource for organizations and undoubtedly, it should be judiciously managed.

The concept of KM is not new in information systems practice and research. It is defined as “a process that deals with the development, storage, retrieval, and dissemination of information and expertise within an organization to support and improve its business performance” (Gupta et al 2000). In the virtual environment, it is of great importance for VOs to harness knowledge in order to stay competitive and innovative. The KM of a VO involves recognizing and managing all of organization’s intellectual assets to meet business objectives. It “caters to the critical issues of organizational adaptation, survival, and competence in the face of increasingly discontinuous environmental change. Essentially, it embodies organizational processes that seek synergistic combination of data and information processing capacity of information technologies, and the creative and innovative capacity of human beings” (Malhotra 1997). Ideally, given a supportive organizational climate and effective KM, a VO could bear on any problem at anytime, anywhere in the world by reckoning on its entire organizational learning and knowledge.

However, the current business environment characterized by radical and accelerating changes has unfolded the limitation of traditional information-processing view of KM. Specifically, KM has been suffering from the traditional organizational control model. The documents as well as the acquired knowledge get lost due to the lack of effective organizational KM; even worse, some documents are accidentally deleted from the resource pool without any awareness or consciousness.

As the remedy, a faster cycle of knowledge creation and action should be necessarily implemented (Denison & Mishra 1995). Additionally, KM strategy should be altered and aimed at understanding the presence of knowledge communities and the various channels of knowledge sharing within and between them, and applying ICT appropriately (Malhotra 2000).

Meanwhile, as introduced in previous section, Semantic Web is regarded as an effective

medicine to cure KM syndrome. World Wide Web contains virtually boundless information in the form of documents, but these documents still have to be read and interpreted by human before any useful information can be extrapolated. In contrast, the Semantic Web originated by W3C (World Wide Web Consortium) contains both data and documents on the web so that machines can process, transform, assemble, and even act on the data in diverse ways.

Furthermore, Semantic Web is generally built on syntaxes, which use URIs (Uniform Resource Identifier) to represent data in triples based structures. Many triples of URI data that can be held in databases, or interchanged on the World Wide Web using a set of particular RDF (Resource Description Framework) syntaxes developed especially for the task. In addition, the Semantic Web allows anyone to express new concepts that they invent with minimal effort. Its unifying logical language will enable these concepts to be progressively linked into a universal web. This structure will open up the knowledge and workings of humankind to meaningful analysis by software agents, providing a new class of tools by which we can live, work and learn together. (Berners-Lee et al 2001)

2.4 Collaboration in VOs

The virtual context facilitates people to work across organizational boundaries and provides the infrastructure for independent firms across the globe to function together as if they were a single company. As one of the necessities, effective collaborations among these firms are the wellsprings of knowledge and creativity, as well as the key strategic resources for performance success.

Significantly, the richness of ICTs contributes to collaboration in virtual environment by linking people together and creating an electronic shared space where ideas can be pooled and synthesized. Irrespective of locations, it also enables collaborative work to be archived, stored, reviewed, and modified by all participants.

Although ICT provides the communication platform, it is however still the people that ultimately make collaboration work. Consequently, the effectiveness of collaboration in VOs relies on trust among partners at the fundamental level. Handy (1995) proposed “if aiming to enjoy the efficiencies and other benefits of the virtual organization, we will have to rediscover how to run organizations based more on trust than on control.

Virtuality requires trust to make it work; technology on its own is not enough”.

Evidently, the effectiveness of collaboration in a VO is more complex than that in a traditional organization due to the increased uncertainty and complexity derived from the dynamic nature of network and the number of boundaries crossed. Specifically, each company in a VO is very likely to have its own policies, systems, and structures that may not easily mesh with other partners. VO partners therefore can barely depend on following the same policies or operating procedures, belonging to the same culture, using the same systems, or reporting to the same supervisor in order to keep them focused in a common direction.

In order to successfully develop effective ways of working together, organizational structures should correspondingly become more flexible and fluid while encountering the growing challenges of global competition, rapid change, and increasing complexity (Mohrman et al 1998). Besides, in the objective of creating a shared understanding for those firms virtually connected, each partner in a VO should examine its own policies, systems, structures, and culture to see if collaboration would be supported (Cooper & Rousseau 1999); additionally, it should encourage lateral movement and networking to remove barriers to collaboration both within organization and across organizational boundaries.

Furthermore, the collaboration manner can be reconciled by conducting a strategic and effective leadership over all the participants in a VO. In the virtual environment, effective leaders can resolve conflict, build trust, and achieve highly interactive sessions in order to coordinate the collaboration among all the organization partners. Jensen and Scacchi (2005) claimed that insufficient leadership over organizations or individuals is a common source of conflict, which often leads to breakdowns in collaboration. The leadership effectiveness and strategy will be extensively investigated in the forthcoming chapters.

2.5 Virtual Team

The nature of teams has significantly evolved in accordance with organizational changes and the nature of task. While being intertwined with each other, VO partners have been increasingly relying on VTs to fulfill designated task or project, in which

interaction and collaboration take place among geographically distributed and often culturally disparate individuals. Additionally, VTs are commonly adopted as a maneuver by organizations to cut the budgets of travel, relocation, real estate, or other business activities. This is particularly so for businesses which use VOs to build global presence, outsource their operations, or need less common expertise or skills from people who are reluctant to travel or relocate from their home locations.

Being independent of locations, VOs can hire and retain those who have complementary skills to build a globally dispersed VT. These selected VT members are committed to a common purpose and should have interdependent performance goals and share an approach to work for which they hold themselves mutually accountable.

Essentially, VTs are governed by the same fundamental principles as traditional teams. However, the fundamental difference is the way the team members communicate. Instead of using the full spectrum and dynamics of in-office face-to-face exchange, they now rely on communication channels enabled by modern technologies, such as e-mails, faxes, phone calls, and video conferencing. As a consequence of these electronic communication channels, the success and effectiveness of VTs are much more sensitive to the capability of team members selected, task complexity, level of virtual relationship and trust, and particularly the effectiveness of leadership.

3 LEADERSHIP FRAMEWORK

Gardner (1990) defined leadership as “the exercise of social interpretation, where a leader exerts influence through managing the meaning of external context and situations”. Effective leadership, as the decisive factor for organizational success, should create and distribute the organizational vision, glue corporations or individuals together, as well as direct and supervise the execution of the plans. Conversely, insufficient leadership can drag down the organization as it creates inconsistencies and mistrust, provides no clear direction, and shows a lack of concern for employees.

The tasks of leadership have always been complex in large multi-divisional organizations, particularly VOs. Moreover, as a consequence of ICT involvement, leaders nowadays may supervise the entire projects or interact with followers without physical proximity, which in turn causes a new challenge to leadership effectiveness.

This chapter investigates the transition from traditional management to leadership in VOs or VTs, viewed as e-leadership. Additionally, the scholar review on leadership development and corresponding models will be formulated in order to establish a theoretical framework of leadership in VOs.

3.1 Adding “E” into Leadership

Without deviating from traditional leadership, e-leadership also aims at building and enhancing the relationships among organizational members defined by an organization’s structure (Avolio & Kahai 2003). The fundamental difference nevertheless is that e-leadership takes shape in the virtual context where collaboration is mediated by ICTs. In such virtual environment, not only communication between leaders and followers is conveyed via ICT, but also are the collection and dissemination of information required to support organizational tasks. For instance, a participative e-leader may make use of electronic mailing list to inform members within a VO about any latest changes; the members can then discuss with one another or consult the leader via mailing list. In this case, the e-leader is interacting with followers through ICT in order to inform them or to be informed.

Except the utilization of ICT, e-leadership is analogous with the traditional face-to-face

leadership. Avolio and Kahai (2003) asserted that “leadership mediated by information technology can exhibit exactly the same content and style as traditional face-to-face leadership, especially as virtual interactions become more visual”. E-leadership can still be inspiring as in traditional context with physical proximity, although members are spatially dispersed. For example, an e-leader can communicate with members by various technology tools in order to share his/her compelling visions or solicit followers’ opinions before any final decisions. As a result, all the participants will be inspired and prompted, resulting in the pooling of ideas accumulated through the electronic platform.

3.2 Leadership vs. Management

Many people can hardly distinguish leadership from management, or even improperly treat these two conceptions as one. Particularly when asking a number of employees in the organization who they would identify as their leader, you will find they struggle to give a convincing answer or simply refer to their manager or supervisor. If probing a little deeper and asking what the organizational vision is, then you may be met with blank faces or some ambiguous remark about the corporate mission statement, which they had no part in defining and do not really understand.

Such frustrating diffusion between leadership and management is typical in traditional organizations but also in some inordinate VOs. As a subject, leadership is often treated with more mystique than management; it is as though leadership is considered less easy to define or teach. This section will compare leadership with management and investigate the transition from traditional management into the leadership.

3.2.1 Conceptual Differentiation

Generally, Kotter (1990) posited that management is about:

- planning and budgeting
- organizing and staffing
- controlling and problem solving

By contrast, leadership mainly refers to:

- establishing and communicating direction through a vision of the future
- aligning people behind the vision

■ motivating and inspiring people

Grounded upon Kotter's investigation, we can simply delineate the organization as a football team. Manager can be compared to the coach who concerns with the formation, maneuver, and above all, the results; by contrast, leader acts more like the captain in the football field, mainly concentrating on communicating with and prompting other players, setting the striking pace, and most importantly, providing and disseminating a vision toward victory throughout the team.

With regard to organizations, management was basically grounded upon the assumption that tasks should be systematically analyzed and workers should be instructed, monitored, and strictly controlled (Hale & Peter 1997). Overall, management greatly emphasizes on progress and results in order to produce a high degree of order and consistency of results.

Conversely, leadership exists at all levels rather than just on top. It focuses on organizational vision and people, thus presenting itself as a transformational force which is particularly appropriate in VOs. Aiming at effective adaptation to complex, rapidly changing environments, e-leaders strive to achieve highly interactive sessions, build trust, and resolve conflict. Additionally, Bolman and Deal (1991) demonstrated only leadership can reflect a symbolic form in VOs. Successful leaders can symbolically create myth, rituals, and ceremony, all of which articulate the vision of the organization. Clearly, the leader's roles as symbol manipulator and synergy promoter radically differ from those managers'.

3.2.2 Transition from Management to Leadership

In accordance with organizational transition, the innate nature of management is changing with great rapidity. As witnesses to this prominent transition, managers have been threatened on critical aspects such as identity, esteem, power, and control.

In VOs, the classic roles of management may be still important, but their nature has been changed due to the mutative business environment. With a high degree of predictability in the past, organizations were able to react to the latest change and adjust the progress. For example, a long-term plan could be deliberately programmed in order to illuminate direction or specific path for organizations. Evidently, management

was the most appropriate and effective approach to strategically supervise the iteration steps and project progress. Nowadays, however, under the accelerating change curve scenario, an elaborate plan drawn up today may simply become redundant or void tomorrow. Managers thus were encumbered with increasing levels of uncertainty, instability, turbulence, and insecurity.

Moreover, managers have been embracing the challenges stemming from equality among personnel. As the consequence of ubiquitous ICTs, managers have lost their exclusive authority or priority on accessing the information, thus failing to retain their superior positions in controlling resources and information; additionally, driven by high degree of flexibility, participants within a VO can be differently composed every day, resulting in the collapse of manager's role in thoroughly monitoring and controlling subordinates' performance.

Based upon these evidences, the organizational transition has irresistibly eroded the privileged status of manager along with the command-and-control management style (Cooper & Rousseau 1999) in traditional hierarchical organization structure. As a result, it appears that "the very word manager is being used less in organizations today than it was in the past and is being replaced by titles and words such as: facilitator, leader, and adviser" (Hale & Peter 1997).

While traditional management has been gradually de-emphasized, we have been witnessing an increasing interest in the subject of leadership. A large number of organizations are establishing multiple levels of leaders such as team leader, group leader, and project leader in place of supervisory or junior management roles. With such transition, leadership is no longer the preserve of those at the top of the organization.

Focusing on the new set of realistic requirements on leaders, Hale and Peter (1997) asserted that leaders still need to monitor the project progress and adjust the organizational plans, but yet on a more frequent and regular basis; participants are still controlled but the spirit of participation and consultation is strongly expected. Furthermore, leaders ought to be more open-minded so that the voice from low layer in organizations can be heard. Particularly, leaders should never overlook the fact that in some instances, people who may not be the most senior are likely to hold more of the answers and expertise. In addition, the new mindset of leadership also requires leaders to authorize themselves to make decisions, take risks without being fear of

responsibility or consequences, and help others to contend psychologically and physically with uncertainty regarding the future.

3.3 Leadership and Followership

It has been frequently proclaimed that leadership simply involves three things: a leader, followers, and a common goal (Bennis & Thomas 2002). Although leader has a vital effect on the followers, the leader and followers join together in pursuit of the goal, thus equalizing the two. This section investigates the leaders' effect on followers and the interactive relationship between these two parties.

3.3.1 Leaders' Role and Effect

In most entrepreneurial organizations, there is an increasingly strong requirement for leadership qualities and leaders' characteristics. According to Hale and Whitlam (1997), those successful leaders tend to possess two qualities: firstly, they tend to be either very large or very small people physically; and secondly, they have a strong sense of vision presented to followers. Concretely, successful leaders possess the ability to formulate a vision of the future and to convey this vision to followers so that followers become more cohesive and convinced about the organizational goals.

In addition, this requirement in itself also alludes to the need for effective communication skills. Through conversation and presentation, successful leaders will paint rich and colorful pictures, often drawing on the powerful use of analogy, storytelling, and anecdotal examples. Such individuals will be able to motivate others through their sheer commitment and infectious enthusiasm, as well as to model the behaviors they seek to encourage.

Furthermore, leaders will create a sense of urgency when conducting their business, and expect the same from followers (Hale & Whitlam 1997). Striving to retain a proper balance between reactivity and proactivity, leaders prompt followers to move swiftly, talk quickly, and communicate passionately. Furthermore, as the body of knowledge is changing rapidly, it is of high possibility that followers are more knowledgeable or better informed than leaders. Hence, effective leaders always attentively listen to the views and opinions from followers, and empower themselves to make decisions without

a fear of mistakes or recriminations.

3.3.2 Leader-follower Interaction

While leaders motivate followers by appealing to shared values or by satisfying their aspirations and expectations, the reaction from followers is absolutely nontrivial and thus should not be overlooked.

In light of the ambiguous strategic environment, most large organizations require the leader and followers to be steeped into the same core values and energized to collaboratively tackle thorny problems. After articulating the target goal and illustrating the forward direction, the leader should integrate his/her followers onto the same strategic page so that all their energy can be focused to achieve maximum results with less oversight. Meanwhile, it should be realized that the behaviors required from the followers nowadays are not enforceable. Instead, as members participated in a VO or VT work together to complete tasks, their roles become highly interdependent and equalized, thus requiring effective interactions (Balthazard et al 2002).

Although communication via ICTs poses certain challenges on the degree of leader-follower interaction, it however might be easier for all collaborative members to contribute in the virtual environment instead of being significantly hampered by a dominating individual, which is common in traditional collaboration with physical proximity (Potter et al 2000). Furthermore, particularly in the virtual context, leaders and followers will inevitably share a number of the same qualities. In many cases, members of the organization will even have dual roles simultaneously: as leaders and as followers (Hale & Whitlam 1997).

Cooke and Szumal (1994) classified the interactions between leader and followers into two general styles: constructive and defensive. A constructive interaction style is characterized by a balanced concern for personal and group outcomes, cooperation, creativity, free information exchange, and respect for others' perspectives; on the contrary, defensive style includes passive or aggressive behaviors such as limited information sharing, lack of impartiality or creative thinking, excessive emphasis on personal agendas and fulfillment of affiliation goals.

Evidently, whether the dominant interaction style is constructive or defensive can result

in different levels and patterns of effectiveness. Successful leaders always aim at the constructive interaction with followers in order to consistently produce the highest quality solutions, while at the same time they strive to avoid the defensive style burgeoning in the collaborative environment as defensive interaction tends to result in marginal-quality solutions and low levels of member satisfaction (Smith et al 1986).

3.4 Leadership Effectiveness Theories and Models

Although having been re-titled as e-leaders, VO or VT leaders are still sharing the same leadership fundamentals with their traditional counterparts. It is thus necessary to investigate the leadership theories and models as a basis for e-leadership strategy. Early scholars have formulated the leadership models as well as factors contribute to effective e-leadership through a variety of studies and researches. These frameworks can be fundamentally categorized into three groups: trait, behavioral, and contingency.

3.4.1 Leadership Traits

Trait theory mainly focuses on identification of personal and innate attributes that contribute to effective leadership. A large body of work in this category has examined the relationship between leadership and a variety of physical, cognitive, and personality traits. Generally, Clark (1997) posited the coherent cluster of successful leader's traits as follows:

- *Honesty*. A leader should display sincerity, integrity, and candor in all actions. Deceptive behavior will not inspire trust.
- *Competent*. Leaders' actions should be based on reason and moral principles rather than childlike emotional desires or feelings.
- *Vision*. A leader should have a vision of the future, which must be disseminated throughout the organization. Effective leaders envision what they want and how to get it. They habitually pick priorities stemming from their basic values.
- *Inspiring*. Only by showing endurance in mental, physical, and spiritual stamina can leaders inspire followers to reach for new heights.
- *Fair-minded*. A leader should show fair treatment to all people. Prejudice is the enemy of justice. Leaders display empathy by being sensitive to the feelings, values, interests, and well-being of others.

- *Courageous*. A leader should have the perseverance to accomplish a goal, regardless of the seemingly insurmountable obstacles; additionally, he/she should display a confident calmness when under stress.
- *Straightforward*. Leaders should use sound judgment to make good decisions at the right time.
- *Imaginative*. Leaders should make timely and appropriate changes in thinking, plans, and methods; furthermore, leaders ought to show creativity by thinking of new and better goals, ideas, and solutions to problems.

Despite remarkable efforts on leadership traits contributed by early scholars, trait theory however considered no actual leader behaviors or the contingency aspects of leadership, thus failing to identify a specific set of individual traits that consistently differentiates between effective leaders and non-leaders.

3.4.2 Leadership Behaviors

The behavioral leadership perspective centered the observable actual leadership behavior as opposed to innate qualities. There are a number of early studies providing the foundation for the development of various behavioral leadership models, among which the leadership style will be emphasized in our study.

Viewing from the perspective of leadership style, Burns (1978) coined transactional and transformational leadership in the leadership lexicon. Transactional leadership style, as its name indicates, is based on a transaction or exchange between leader and followers. Leaders with transactional style “approach followers with an eye to exchanging one thing for another: jobs for votes, or subsidies for campaign contributions” (Burns 1978). The transactional style is precisely what happens in a contracting scenario (Jung & Avolio 2000), where the contractor provides the specified service purchased. Lontos (1992) asserted this leadership style “only works well when both leader and followers understand and are in agreement about which tasks are important.”

By contrast, the goal of a transformational leader is to inspire followers to share the leader’s values and connect with the leader’s vision (Homrig 2001). This connection is manifested through leader’s genuine concern for followers and the followers giving their trust in return. A transformational leader would prompt followers to support his/her vision by sharing ideas, talents, and labor in order to achieve genuine satisfaction or

attain virtuous goals for not only the leader himself/herself but also the followers and the organization.

What is worth mentioning here, however, is that transformational and transactional leaderships are not at odds but complementing each other. Transaction is an effective and necessary tool for leaders at all levels while transformational leadership augments the effectiveness of transactional leadership rather than replace it (Bass 1985). Although transformational leadership style is favored by most organizations, transformational leaders may resort to the transactional style especially when they aim at coining a double-win problem-solving situation. Hence, there is no specific formula or checklist to determine which style is more appropriate in any given situation. Often the best leadership derives from the mixture of these two leadership styles.

3.4.3 Leadership Contingency

In spite of the popularity of behavioral perspective and consistency in the classification of leader behaviors, the behavioral theory failed to identify a clear and consistent relationship between various leader behaviors and leadership effectiveness (Yoo & Alavi 2003), which in turn led to the development of contingency leadership theory.

Contingency theory contends firstly there is no best way of leading, and secondly, a leadership style that was effective in certain situations may fail in others. A typical effect is that leaders who were very effective at one place or time may become unsuccessful when being transplanted to another situation or the factors around them change. This theory helps to explain why some leaders who seemed to have the “Midas touch” suddenly appear to go off the boil and make inappropriate decisions. Figure 1 illustrates the fundamental leadership contingency theories developed by Fiedler (1976).

Nature of the situation

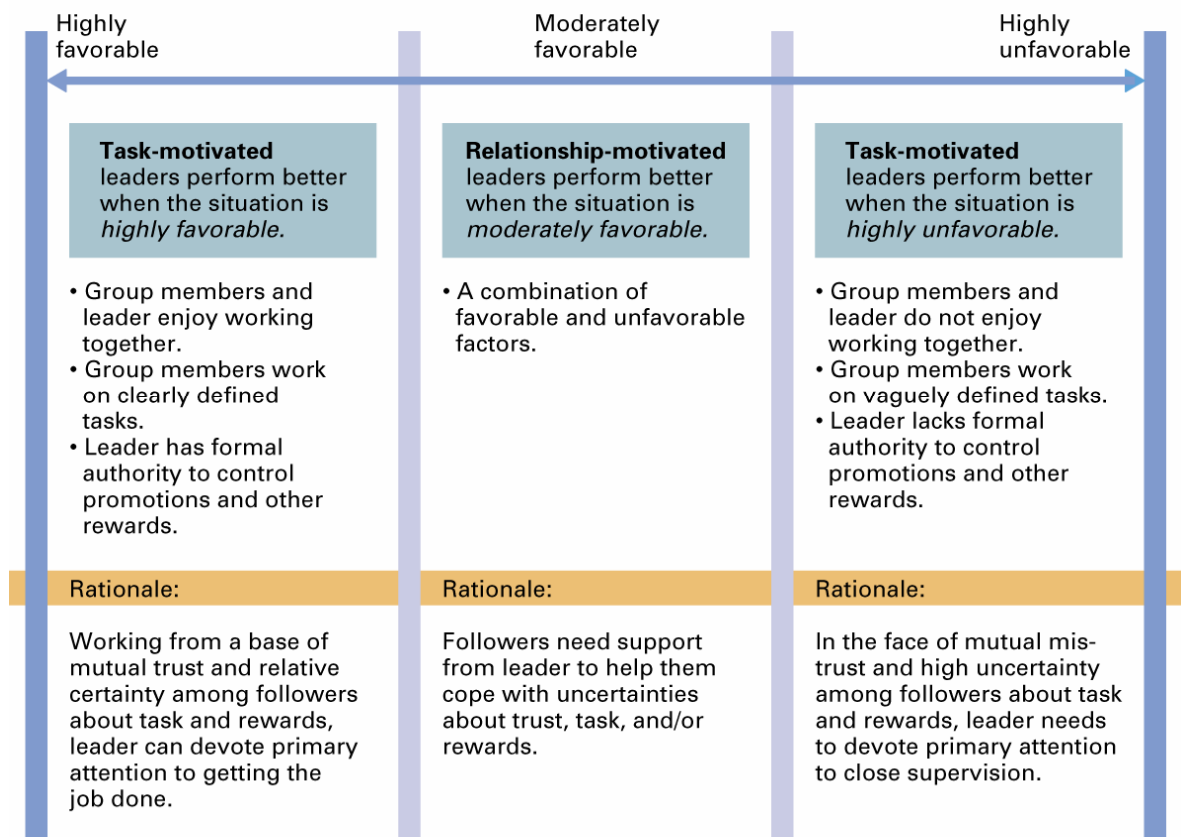


Figure 1. Fiedler's contingency leadership theory

(Source: Fiedler 1976 cited in Houghton Mifflin Company 2002)

In accordance with Fiedler's contingency theory, multiple subsequent contingency theories have emerged correspondingly. This section will continue to briefly illustrate six main contingency theories, which are LPC (Least Preferred Co-Worker) contingency model, situational model, path-goal theory, multiple-linkage model, substitute theory, and normative decision model. Significantly, each subsequent contingency theory moves away from a centralization of the leader-follower relationship but progressively emphasizes the importance of situational variables on leadership effectiveness.

LPC Contingency Model

This model describes how the situation moderates the relationship between leadership effectiveness and a trait measure called Least Preferred Co-Worker (LPC) score (Yukl 1998). LPC score is determined by a set of questions for leaders as following steps: firstly, the leader is requested to think of a person who they would like to work with again; secondly, the leader should score this person on a range of scales between

positive factors (e.g. friendly, helpful, cheerful) and negative factors (e.g. unfriendly, unhelpful, gloomy).

Empirical scoring results (Yukl 1998) indicated that a high LPC leader generally scores another person as positive. These high LPC leaders tend to have close and positive relationships with others and act in a supportive way of prioritizing the relationship before the task. Conversely, a low LPC leader usually scores others as negative. Scarcely will those leaders with low LPC prioritize the relationship since they excessively concentrate on project progress and result. Only if the work progresses smoothly will those leaders then start considering relationship.

Situational Model

The situational leadership approach (Hersey & Blanchard 1977) suggests that the leader must act in a flexible manner in order to diagnose and further apply the appropriate leadership style to the specific situation; additionally, rather than a special breed, leaders can be molded by developing individuals' capabilities and skills for leadership. Figure 2 explores the situational leadership model from the perspectives of relationship behavior, task behavior, and maturity of followers.

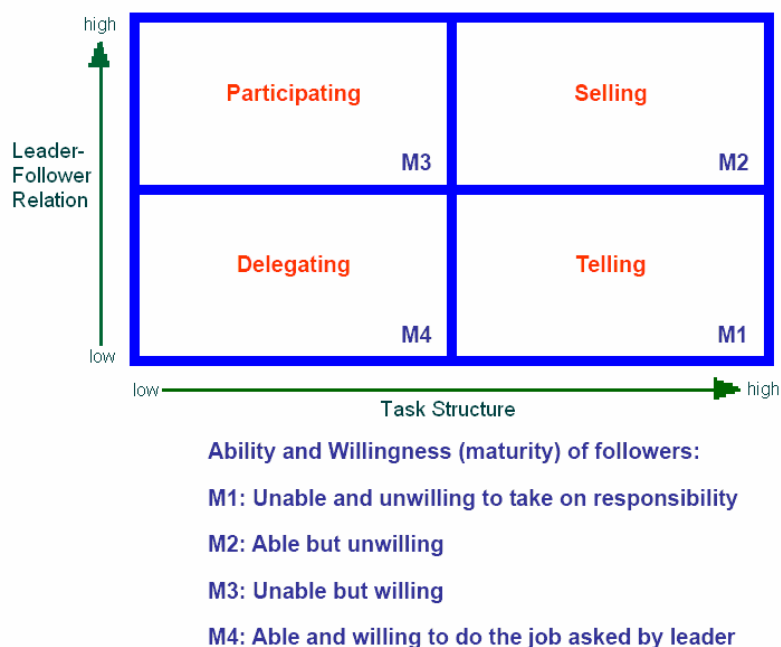


Figure 2. Leadership situational theory

(Source: Sharma 1995; Hersey & Blanchard 1977)

Path-Goal Theory

As the originators of the path-goal theory, House and Mitchell (1977) claimed “the leader should make desired rewards available (goal) and clarify for the subordinate the kinds of behavior that will lead to the reward (path)”. Figure 3 displays the key concepts of path-goal theory and illustrates the relationship between one another by flows.

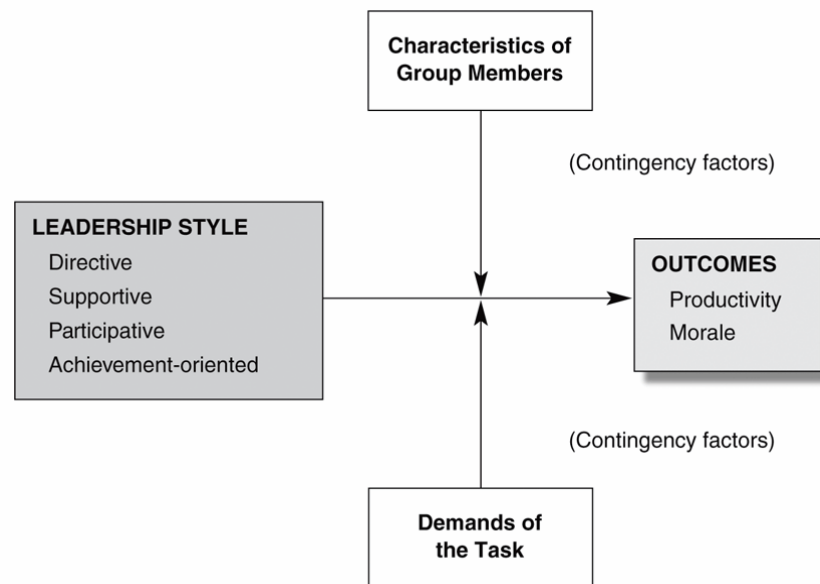


Figure 3. Leadership path-goal theory

(Source: House & Mitchell 1977)

According to Figure 3, the path-goal theory proposes four types of leader behaviors as follows:

- *Directive leadership*: characterized by a leader who explicates expectations and provides specific guidance to the followers.
- *Supportive Leadership*: characterized by a leader who is friendly and approachable, and mostly, concerns about the status, well-being, and personal needs of the subordinates.
- *Participative leadership*: characterized by a leader who consults subordinates or asks for their suggestions before making any final decision.
- *Achievement-oriented leadership*: characterized by a leader who sets challenging goals, prompts followers to endeavor, and shows confidence in their abilities to fulfill the task.

To achieve the outcomes of productivity and morale, one of the above four leadership styles will be chosen depending on the characteristics of the situation and the demands of task.

Multiple Linkage Model

Based upon earlier models of leadership effectiveness, the multiple-linkage model proposes that the overall impact of specific leader behaviors on group performance is fairly complex and composed of four sets of variables, which are managerial behaviors, intervening variables, criterion variables, and situational variables. Among these four variables, however, only intervening and situational variables are influential in determining leader effectiveness, thus representing the core of this model.

Intervening variables affect on leader behaviors and measures of leadership effectiveness. Six intervening variables have been identified in this model, known as task commitment, ability and role clarity, organization of work, cooperation and mutual trust, resources, and support and external coordination. Conversely, situational variables moderate the leader's impact on group performance. This model identified two situational variables, which are the formal reward system and the intrinsically motivating properties of the work itself. (Yukl 1998)

According to the multiple linkage model, the job of a leader differs substantially in different situations. As proposed by Howell and Costley (2001), in the case of a short term, the first-line task for a leader is to correct deficiencies arising in the intervening variables; however, when being in a long term, a leader should rather improve situational factors.

Substitute Theory

Leadership substitute theory suggests certain situational factors can substitute, amplify, or neutralize the effects of a leader's behavior (Spencer 2002). Concretely, this theory categorizes situational variables that can affect leaders' demands into two types, which are substitutes and neutralizers.

Substitutes can be either multiplicity of the situation aspects or diverse the follower characteristics. As indicated in its name, substitutes will cause the rise of intervening variables, thus replacing the role of a leader and rendering leader behavior redundant

(Spencer 2002). Neutralizers, on the other hand, prevent a leader from acting effectively (Yukl 1998). They present themselves as the constraints of any improvements to the intervening variables, thus blocking leader effectiveness.

Normative Decision Model

Vroom and Yetton (1973) developed a leadership model that specifies which decision procedures should be most effective in different situations. This normative decision model is viewed as a decision making tree which enables a leader to examine a specific situational factors and then determine the appropriate leadership style or level of involvement.

This model introduces two intervening variables known as decision quality and decision acceptance, which determine the overall effectiveness of a decision. Decision quality refers to the objective aspects of a decision that affect group performance, regardless of any effects mediated by decision acceptance; whereas decision acceptance is determined by the degree of follower commitment in effectively implementing a decision (Spencer 2002).

Clearly, both decision quality and decision acceptance can be affected by leader behavior and follower participation during decision making. Additionally, these two variables can also be impacted by the specific situation. Therefore, aiming at determining the appropriate level of involvement in decision making, this model suggests leaders to thoroughly investigate the nature of the problem, decision, and consequences.

Summary

In conclusion, Table 3 outlines the basic features of six contingency theories and compares the respective content and validation with one another.

Table 3. Comparison of six contingency theories

(Sources: Yuki 1994, p.311; Hersey & Blanchard 1977)

Contingency Theory	Leader Traits	Leader Behavior	Situational Variables	Intervening Variables
LPC Contingency Model	LPC	None	1. Task Structure 2. L-M Relations	None
Situational Model	None	Develop capabilities	Many aspects	1. Ability 2. Willingness
Path-Goal Theory	None	1. Instrumental 2. Supportive 3. Participative 4. Achievement	Many aspects	1. Expectancies 2. Valences 3. Role Ambiguity
Multiple Linkage Model	None	1. Managerial 2. Intervening 3. Criterion 4. Situational	1. Formal reward system 2. Intrinsically motivating properties of work	1. Task commitment 2. Ability and role clarity 3. Organization of work 4. Cooperation and mutual trust 5. Resources 6. Support and external coordination
Substitute Theory	None	1. Instrumental 2. Supportive	1. Substitutes 2. Neutralizers	None
Normative Decision Model	None	Decision Procedures	Many aspects	1. Decision Quality 2. Decision Acceptance

4 RESEARCH METHODOLOGY

This experimental study aims to investigate VT formation, address the challenges associated with virtual environment, and improve the effectiveness of e-leadership. Focusing on NRC (Nokia Research Center) and Talentor (Talentor Group Oy), we conducted the experimental research by using interview and survey methodology to examine the current leadership conditions and elicit relevant implications and propositions.

4.1 Case Study: NRC and Talentor

The two firms involved in this case study are NRC and Talentor, which are representative in technology and business fields respectively. This section briefly introduces each firm's background information and virtual collaboration status under consents by NRC and Talentor.

4.1.1 NRC

NRC, founded in 1986, is Nokia's corporate research unit of about 700 employees. Its mission is to renew Nokia through strategic and long-term research, while its vision is to become the global leader of open innovation for human mobility systems of the fused physical and digital world, giving birth to the growth of businesses for Nokia. Today, NRC is very much a living organization, always ready to renew itself and blaze new trails. The organization reflects dual approach to innovation to seek core technology breakthroughs and identify new business opportunities through exploratory systems research.

NRC cooperates with many leading academic institutions and other technology companies in many research projects. NRC works in open innovation mode and has built network of leading universities including MIT in USA, Stanford University in USA, Tsinghua University in China, Cambridge University in UK, Tampere University in Finland, Helsinki University in Finland, and EPFL & ETHZ in Switzerland.

Furthermore, NRC has built worldwide networks with R&D (Research and

Development) centers in 10 countries to facilitate global collaborations. Morph and 100 cars project are the recent examples of NRC's cooperation projects. The Morph concept was conceived out of a scientific partnership between NRC and the Cambridge Nanoscience centre for the Museum of Modern Art in New York; 100 cars project was under the collaboration of NRC and UC Berkeley, aiming to provide real-time traffic information based on speed and location data from GPS-enabled mobile devices carried by motorists.

Overall, NRC looks beyond Nokia's existing business and product development to challenge current strategies and to stimulate renewal in the company's direction. Working closely with all Nokia business units, NRC's research explores new frontiers in digital services, physical-digital connections, human inter-action, data and content technologies, device architecture, and access and connectivity. NRC promotes open innovation by working on research projects in collaboration with universities and research institutes around the world.

4.1.2 Talentor

Talentor Group Oy is an international consulting agency specialized in recruitment as well as HR management services and solutions. The objective of Talentor is to solve complex recruiting challenges by integrating tradition with technology and innovation, while its vision is to reshape the way people seek jobs and corporations look for talents.

Talentor offers HR management services in all essential areas such as HR outsourcing, HR surveys and training, as well as other consulting services; additionally, it offers recruitment services in fields, such as, information technologies, health care, commerce, sales and marketing, industry and telecommunications.

Talentor has stretched its business not only across Finland but also to Estonia, Latvia, and Lithuania. It meets the strategic needs from customers by adopting innovative and added value solutions on the basis of its extensive expertise, best practice processes, large networks, and modern information technologies.

Furthermore, Talentor also developed the Internet platform to enhance HR processes. The platform consists of JobGO and CvContactor. JobGO is a recruitment media on the Internet fully functional on all levels. CvContactor is a recruitment management system

which primarily enhances the recruitment processes and the information flow within recruitment.

4.2 Methodology

The experimental study was conducted using interview as the main methodology and survey as the minor. The leadership framework in theory part was used as a basis for interview and survey question constructions. All the interview questions and questionnaires were pre-tested with a small group of participants who were not used in the final analysis. After some basic analysis of the reliability of each preliminary scale, all instruments were correspondingly modified and then used to elicit opinion or capture data in experimental study.

4.2.1 Participants

Those individuals who participated in experimental study were both male and female employees, and ranged in age from their 20s to late 40s. Different educational and socio-economic background was represented, from workers with bachelor's degree to those with PhD diploma. In addition, these participants came from a variety of professional settings including research, product development, sales, marketing, recruiting, and management consulting with different levels in organizations from the workers up to a company president. They worked in distributed teams that stretched across Finland as well as to several countries in Europe, America, and Asia. These participants were anonymous in the sense that records of their identities were not kept and identifying information was removed from their data.

4.2.2 Procedure

Interview participants were scheduled for an interview time, and met the interviewer in a private office or small meeting room. The participants were asked for their permission to tape record the interview session, and were assured that their responses would remain anonymous and confidential. All participants agreed to the recording.

Each participant received a written copy of the interview questions as well as a verbal

explanation of the objectives of this study prior to the interview session. The interview lasted approximately 30 minutes on average. The interview questions were designed to focus participants on e-leadership challenges, strategies, and effectiveness. The interview format consisted of five basic sections, which were technology, communication, trust and leadership style, conflicts, and closure (see Appendix 1). Grounded on these aspects, interview participants were requested to describe their observations and perceptions of e-leadership challenges and strategies associated with the virtual context.

In order to complementarily examine the current situation of e-leadership, two on-line questionnaires were established on the platform of SurveyConsole, one of which is designed for e-leaders (see Appendix 2) whereas the other is for followers (see Appendix 3). Questionnaire participants were asked to complete either of these two on-line questionnaires conforming to their role in the company.

The ensuing chapters will synthesize the research data (including interview and survey) elicited from NRC and Talentor. Furthermore, grounded on these data, the current leadership conditions will be analyzed and assessed in Chapter 5. Chapter 6 will mainly focus on VT conflicts perceived and described by interview participants. Additionally, the conflict attributions and resolution approaches will also be investigated in our experimental study.

5 E-LEADERSHIP PERFORMANCE AND STRATEGIES

The constant parade of ICT development has unfolded a new context for leadership, referring to e-leadership or virtual leadership. E-leadership is considered extremely crucial to organizational performance, while e-leaders play pivotal roles in modeling effective teamwork and setting ground rules for team members to engage in successful team processes.

As much as we have learned about leadership in general, we start to consider particularly how to build and sustain e-leadership in virtual context where trust is difficult to build, influence is hard to articulate, and communication is often ambiguous. Among a range of e-leadership challenges inherent to the dispersed and often impersonal nature, technology, communication, cultural differences, trust, and logistics are the typical issues. Without addressing these challenges before moving forward, e-leadership and VOs can be problematic and fragile.

This field-based study was undertaken to assess the current e-leadership performance in NRC and Talentor from four perspectives: technology, communication, trust, and leadership style. Grounded on the e-leaders' descriptions of their VT experiences, each area is discussed in details and followed by a set of implications and related strategies that outline specific critical success factors for effective e-leadership.

5.1 Technology

The innovative technology allows transmission of any information across vast distances in little time and at little expense, thus leading traditional collaboration into the virtual context. However, the technology tools at the disposal of VTs hamper leaders from addressing the difficulties of coordination, thus in turn posing new requirements on e-leaders who aim at creating a cohesive and consistent teamwork environment.

5.1.1 Technology Challenge

From e-leaders' perspective, variance among individual's level of proficiency or skill in ICTs plays a significant role in team success (Kayworth & Leidner 2000). For example,

after designating “Earth-link” as the on-line video meeting software, an e-leader might surprisingly find part of his team members is not capable of accessing or using this service. Although VOs or VTs can train that part of members to gain proficiency with new information technologies, this remedy however requires a substantive investment due to heavy dependence on technology. Moreover, given the differences in individual predispositions to learn new technologies, membership on VTs may be highly biased toward those individuals skilled at learning new technologies but against those who experience technophobia. This typical frustrating scenario suggests that level of technical expertise appears pivotal in VT’s ability to adopt and successfully use innovative ICTs.

Another technology challenge stems from the unrestrictive access to information. Traditionally, leaders had exclusive access and high priority to the information. However, followers today can also access into the same information via ubiquitous Internet technologies. As a result, virtual members may be more knowledgeable and thus are able to justify leader’s decisions more quickly, which have inevitably laid great pressure on leaders.

Moreover, the organizational transparency as a consequence of ICT also elicits a challenge to e-leadership. If a member expressed discontent with a leader’s action or decision in the past, the powerful leader would possibly keep such individuals separated or disorganized. Nevertheless, the innovation of technology has changed the traditional hierarchical organization structure, resulting in the organizational permeability and transparency. Such malcontents nowadays can rather take actions such as delivering a complaint e-mail to the top-layer supervisors, or even more radically, sending a reproachful message to the entire workforce. In this sense, e-leadership is under the supervision of all the members, thus increasing the strain upon e-leaders. Without cautiously implemented, e-leadership would collapse into inconsistency, inhospitality, and eventually chaos.

5.1.2 Research Analysis

This sub-section aims to practically explore the current conditions of technology utilizations drawing from the interview and survey results in NRC and Talentor.

Monotonous Use of Technology

In order to examine the current situation of technology utilization, the research participants were requested to rank the first three technology tools they used most frequently and commonly in virtual environment. Our findings reflected that e-mail was so prominent for these VTs that all participants marked it as the most frequently and commonly used technology tool in VT settings. Figure 4 illustrates the first three frequently used technology tools in NRC and Talentor.

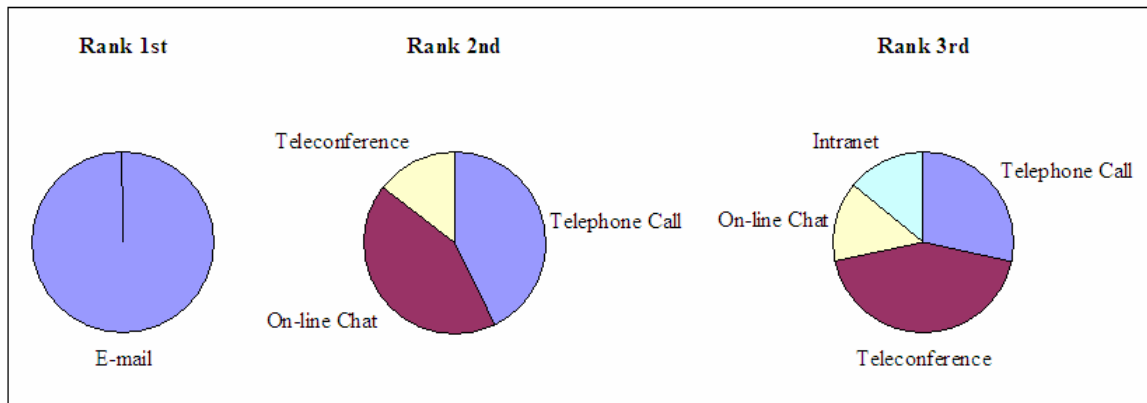


Figure 4. The first three frequently used technology tools in VTs

According to Figure 4, an overwhelming majority of research participants communicated with their peers by monotonously relying on common information technologies, most of which were e-mail, telephone call, and on-line chat. These lean technology tools were used by e-leaders and team members everyday to exchange routine business information.

On the other hand, team-based communication technologies including group telephone conferences, groupware applications, and video conferences were not often used. Significantly, video conferencing, the very tool that could possibly mitigate the teams' difficulties related to infrequent face-to-face interaction by electronically bringing team members together was used merely once a month by majority of research participants, and even less in some cases.

Limitations of Technology

Unlike in traditional environment, e-leaders can not communicate with their team members through face-to-face interactions. Instead, diverse ICTs have become the conveyance during virtual collaborations. However, ICTs have their own limitations and

may not be able to transfer the same rich social, emotional, and non-verbal information present in traditional face-to-face settings.

E-mail

Although e-leaders ranked e-mail as the top technology tool, they have in the meantime recognized that e-mail is only effective for communication within an already-established interpretive context:

'E-mail would only be useful and effective when the leader intends to describe the task. In that case, followers can easily understand the task description and then follow the instruction in e-mails.'

'When I intend to send a document to my peers, e-mail is my first choice since I can attach this file as attachment and explain the relevant guidelines or requirements in the e-mail text.'

Out of task description cases, the effectiveness of e-mail has been questioned. Clearly, no facial expressions, voice inflections, or gestures can be transmitted through e-mails, resulting in the lack of social presence. This limitation can trigger misinterpretation and misunderstanding, and further compromise the trust relationship in VTs. Moreover, individual's social status or expertise level may be lost or distorted due to high levels of anonymity in e-mails. In addition, the ability to develop relational links among team members may be hindered by e-mail communication, which may negatively affect such outcomes as creativity, morale, and decision-making quality.

'E-mail is cold and plain. It cannot express my feelings or emotions. In some cases, my intention in e-mail was misinterpreted by others. Then I have to call them to explain myself.'

'Clarifying or explaining conflict issues by e-mails is really inefficient. We can't see each other's faces, nor can we hear the voice tone. The plain text is very likely to cause misunderstanding. In these cases, we would rather use telephone calls or video conferences.'

Moreover, as the high-access, one-to-many media, e-mail may cause large volumes of communication on concurrent tasks, which can possibly lead to information overload;

additionally, individuals under asynchronous environment may be inclined to send longer and more carefully crafted messages, which adversely impose an even greater information processing burden on VT peers as they attempt to decipher and respond to these messages. Evidently, the human brain suffers from cognitive overload when there is too much information to digest. In our study, interview participants chose to ignore certain information as the measure to cope with information overload, which can possibly cause biased discussion or less mutual knowledge.

'I receive large amount of e-mails everyday, ranging from fifty to more than one hundred. Obviously, I cannot sit in my office and reply all the e-mails along the day. It is thus impossible for me to read all of them. If it is urgent, I prefer others can give me a phone call.'

'There have been too many e-mails for me to reply everyday. I could not tell which one was important or urgent from the e-mail subject titles. Sometimes I had to skip some trivial ones; at least I hoped they were.'

E-mail communication problems could also be attributed to the delay of response. One interviewee has experienced significant time delays in e-mail communication under the condition of seven-hour time zone differences between Finnish project leader and North American team members.

'When I sent e-mails, I never expected to receive response immediately from the other side of world. If I send an e-mail to USA today, I will normally get reply the day after tomorrow. Therefore, in this very project, I didn't use e-mail often. Rather, I gave them telephone calls or used on-line chat if I expected immediate reply.'

As demonstrated in the above comment, being asynchronous in nature, e-mail is unable to interact in the same rich way afforded by web-based collaboration tools. These inherent weaknesses often resulted in lost meanings and untimely decision-making.

Video Conferencing

While lean communication media (particularly e-mail) limits e-leaders' ability to effectively manage projects, rich communication platform may be comparatively useful for creating a shared interpretive context. Our findings proved video conferencing effective in gluing remote members together if made available to the teams. The

following comment from NRC illustrates the effectiveness of video conferencing:

‘The Hello NetMeeting Room in NRC is quite effective. There are a table and a wall of screens in the room, and all the rooms look like the same so I can see the others at the remote end as we were sharing the same space. I consider there is no delay in the communication of video images.’

On the other hand, video conferencing requires a high level of technology infrastructures such as fast connection, high bandwidth, and uniform implementations on both ends, all of which are difficult to be achieved in some circumstances.

‘When I wished to establish a video conference with my team members sit in different countries, we found our technological infrastructures differ from each other. Then it became really infeasible.’

‘The question remains how to involve more than two parties into this video conferencing. Then there could be some sort of virtual office where we can meet people and share not only the documents and images.’

Moreover, personal communications with some participants in this study revealed that although video conferencing electronically brings team members together, it is still unable to present the identical impact as face-to-face interaction, thus debasing the efficacy of video conferencing.

‘Eye contact should be improved in the video conferencing technology so that the other person would see you are looking at him or her. Without eye contact, the video conference cannot make people feel any closer.’

5.1.3 Implications and Strategies

The arguments from interview and questionnaire analysis suggest a cluster of leadership strategies to optimize the technology utilization.

(a) E-leaders should seek to provide a broad portfolio of ICTs to accommodate the varying communications needs of team members.

The majority of VTs in our research heavily relied on lean communication methods, whereas leaving those novel information technologies untouched. E-leaders are recommended to employ media richness including the common media (e.g. e-mail, telephone call) as well as those advanced technologies (e.g. flash meeting, video conferencing).

Those advanced technologies can complement e-leadership effectiveness but also aid in recording individual's social status, responsibility, and level of expertise. With these improved tools, the interpersonal connections between dispersed team members could be substantially enhanced, thus facilitating collaborative work.

(b) E-leaders should be aware that technologies are only a partial element for team success.

Evidently, VTs could be more effective if novel advanced technologies were adopted; however, even being equipped with the most advanced technologies is scarcely enough to make a VT effective. The internal group dynamics and external support mechanisms are also indispensable for team success in the virtual world. Those distributed work groups thus must take ample time during the initial design phase to determine their future goals and develop supportive collaboration environments.

(c) The specific communication needs determine which types of CMCS (Computer Mediated Communication Systems) are appropriate.

For example, group discussion of a critical issue on sales meeting may require a more rich communication channel due to the need for high degree of interaction, immediacy of feedback, as well as the need to view others' comments in a synchronous manner. In contrast, when distributing a monthly meeting memo among team members, e-mail may be the effective vehicle since less interaction or immediate feedback is required in that case.

(d) E-leaders should be aware and conscious of team members' varying levels of proficiency in using advanced technologies.

Clearly, VT effectiveness will be optimized when team members possess the complementary skills, knowledge, and experience of technology manipulation.

However, as individuals often have different levels of proficiency in groupware tools, e-leaders must pay great attentions to the use of technologies, communication platforms, and guidelines which assure information is adequately shared and comprehended. Conversely, e-leaders who try to improve VT performance by simply providing followers with more advanced technologies may be misdirecting team resources. One interviewee claimed 'technology that supports video conferencing has to uniform; in some cases, team members were unfamiliar with the designated conferencing technology or have different technology norms, which caused technology conflicts.'

Therefore, e-leaders are suggested to assess their team members' capability of using various technology tools prior to virtual collaboration or coordination. Under regular circumstance, e-leaders may adopt common and diffusive communication channels such as telephone call, e-mail, and on-line chat, which would be adequate for VT to build a desirable collaborative relationship. Nevertheless, if e-leader insists to employ any new and complex information technology tool, he/she should stay aware of members' different levels of technical expertise. Rather than simply notify followers which groupware will be adopted, e-leader should organize or arrange certain training or remediation beforehand in order to familiarize his/her team members with the specific technology. Besides, the team-wide training course would be a rousing start to effectively communicate amongst team members.

(e) If budget permits, e-leaders may consider utilizing more face-to-face interaction to address the technological limitations.

Many participants have highlighted the need for more personal contact to establish supportive team member relations and to improve the team performance. One testing manager who participated in this study stated: 'Meeting my team members on a face-to-face level will help me put faces on the names, as well as develop virtual relationships with them through social interactions.'

(f) E-leaders should be concerned about their technology tools before they break down.

Due to low probability of physical proximity, communication within VOs and VTs is heavily dependent on technology. Once if the technology tool was halted, the collaboration among dispersed work groups would be stagnant. Unfortunately, ICTs can hardly gain any recognition in VOs or VTs until they break down. Hence, e-leaders

should correspondingly underpin the technology maintenance and pay particular attention to technology tools before malfunction or breakdown.

(g) E-leaders should follow a strategy that seeks to maintain low telecommunications costs while at the same time maintaining high quality transmission capabilities.

As evidenced from this study, differences in IT infrastructure capabilities among geographic regions led to problems in exchanging information in a timely and effective manner. Therefore, e-leaders should consider the relative strengths and weaknesses of the infrastructures represented by the various geographic regions of VT members.

(h) Facing the challenge stemming from the unrestrictive access to information, e-leaders should treat this shift as impetus instead of impediment.

As VT members who come from different departments or corporations are often specialized in diverse knowledge domains, it is therefore very important for e-leaders to encourage team members to share their expertise during the decision-making process. Meanwhile, e-leaders ought to be prudent in disseminating the information among team members in order to avoid any repetitions.

Furthermore, the equalization between leader and followers drives e-leaders to fully understand each team member's ability, skill, talents, strengths, and weaknesses. This can enable e-leaders to harness the current team potential or to perceive the specific supports needed from team recruits.

5.2 Communication

Although effective communication is essential to team performance in both traditional and virtual environments, VTs comparatively are facing a much greater strain on communications as team members endeavor to achieve interaction, mutual understanding, and consensus in the absence of rich face-to-face interaction. The ability to implement effective communication patterns is pivotal to the success of VO and VT functioning.

5.2.1 Communication Challenge

Instead of cramming employees inside tiny cubicles, VOs take advantage of recent technologies such as video conferencing and mobile phones to cut cost and streamline operations. However, this structural change has remodeled the interactions and relationships between the parties involved. From leaders' perspective, lack of face-to-face contact with VT members severely restricts leaders' ability to monitor team member performance, to implement solutions to any emergent problems, as well as to perform typical mentoring, coaching, or developmental functions. From the perspective of team member, physical absence might result in fewer available referents within the organization's boundaries for the members to judge their own progress (Deondra 2003). Fernández (2007) also argued that physical absence will lead to the lack of teamwork feeling, thus causing an adverse influence on team members' performance.

Moreover, physical absence impedes social presence and information-rich nonverbal cues being conveyed through ICTs (Warkentin et al 1997). Apparently, members can barely express facial expressions, voice inflections, and gestures via e-mail or in on-line chat rooms. In some instances, written communications could even be misapprehended by the receiver. For example, one sends his colleague an e-mail full of witticisms; nevertheless, his colleague might not comprehend his humor but take it as contempt.

Walther and Burgoon (1992) contended lacking physical proximity may hinder the ability to develop relational links within VTs, thus deteriorating the team's creativity, morale, and decision-making quality. Hence, it is exceedingly complex and challenging for e-leaders to retain all team members glued in virtual environment where physical contacts such as handshakes or patting on one's back are infeasible.

In addition, time zone diversity also becomes a natural problem to effective communication. Imagine the extra complexity of scheduling an on-line meeting for example. If a team is comprised of members across a number of time zones, arranging a real-time video conference becomes arduous, thus faltering e-leadership with excessive logistic preparation. In such circumstances, asynchronous media channels such as e-mail or voice mail might be the best communication vehicles. However, it is of high possibility that e-mail and voice mail message may be misinterpreted or misunderstood. Moreover, the use of asynchronous technologies will leave a gap between query and answer, which can be stressful and inefficient in most time critical projects where team outcome and success are primarily judged based on whether time deadlines are met.

It has been increasingly important for e-leaders to recognize that when residing in different time zones, VT members probably also come from different countries. This fact indicates e-leaders should also take cultural difference into account when struggling to overcome communication barriers. Rayner (1997) exposed the varying cultural assumptions regarding time will impact the gap between query and answer. For example, Krishna et al (2004) concluded Japanese professionals take longer time than Indians to reply to an e-mail due to their limited competence in English language and their work-related communication culture. From e-leadership perspective, these differential temporal rhythms around the use of e-mail would be a typical example of communication and schedule challenges, particularly how silence is interpreted in different locations.

5.2.2 Research Analysis

This sub-section analyzes the current communication patterns and manners in NRC and Talentor from aspects of vision, feedbacks, face-to-face meeting, and time zone diversity.

Vision

One of e-leader's main roles is to articulate the vision of the team's or organizational goals. The creation of a shared vision is an essential manifestation of leadership in knowledge-oriented groups. While there is a significant direct effect of vision on team performance, the indirect effects through vision communication are equally important. In other words, while a vision affects performance directly, it is more likely to upgrade performance if the vision is thoroughly understood and comprehended by employees. Nevertheless, simply articulating and communicating a well-formulated vision is scarcely enough to guarantee results as many leaders or companies fail to walk the walk, talk the talk.

'From my point of view, how to share leader's vision is the most challenging issue associated with a virtual environment. I could not use methods from traditional team management. Neither can I easily share the vision to team members without physical proximity.'

'Sharing or disseminating leader's vision is trickier than it looks. I cannot just simply tell

them what the vision or goal is. That is obviously not enough to have them connected with the leader's value and vision. I have to clarify it through different ways during our collaborations and build relational links as prerequisite.'

Feedbacks

From e-leader's perspective, one critical aspect of effective communication is to provide regular and continuous feedbacks to followers throughout the life of the project. Our study observed effective leaders put a high priority on maintaining regular communication and providing valuable advices, while at the same time soliciting opinions from individual team members:

'Our leader contacted us frequently with his ideas concerning the project. He was always willing to hear our opinions and ideas on the topic. He also responded quickly to questions or comments from us.'

In contrast, it was evident that the absence of continual feedback was considered intolerable by team members and had adverse effects on leadership effectiveness and team performance:

'Our leader did not adequately explain his idea of the project. When we sent e-mails to him for clarity, he seldom replied to us. He might be really busy in those days, but after all we had to get clarifications from others.'

Focusing on strategy for providing continual feedbacks, majority of leaders participated in our research had a high degree of awareness of distinguishing negative feedbacks from positive ones by accordingly adopting different communication media. Nevertheless, when e-leaders intended to provide feedbacks in a swift manner particularly in time-driven projects, telephone call became the resort. The following comments from interview participants represent typical leader's planned strategies to provide regular feedbacks.

'When my feedback is positive, I will use on-line chat to approve my team member's suggestions. But if I am going to give a negative feedback, I'll try to use e-mail because I can elaborate why his/her idea was rejected and e-mail won't be so direct to others' feeling compared to telephone call.'

'After receiving my team members' suggestions, I would turn back to them as soon as I can. I prefer using the telephone call instead of e-mail to give my feedbacks so that one-to-one interaction can be achieved, and we can also discuss the details on the phone.'

'If face-to-face feedbacks are not practical, I always choose telephone call to give my feedbacks because providing feedbacks is definitely not one way traffic but requires bi-directional discussion. On the other hand, I never use e-mails since it requires prudence to choose the right words in e-mail text particularly when it is a negative feedback.'

Face-to-face Meeting

The previous sections support the notion that ICTs have limitations and may fail to convey the same rich social, emotional, and non-verbal information present in face-to-face settings. Consequently, even those VTs that utilize rich web-based collaboration technologies are inevitably suffering from the lack of face-to-face contact.

Obviously, face-to-face interaction is far more effective and efficient than communication through technology platforms. It enables VT members to see facial and body expressions, to hear voice emphasis and inflection, as well as to sense approval and misunderstanding:

'Face-to-face meeting is always the best way to cover lots of topics. When we sit down to have a face-to-face meeting for a few hours, those topics we discussed in these hours can take weeks or months to be covered if using e-mails. Particularly if the topic is urgent, face-to-face is the most efficient way to take it forward; it also saves the time to negotiate the availability of teleconferences.'

'I could understand my team members' capabilities and skills better if meeting them face-to-face. I can also learn how to communicate with them during the ensuing collaborations. Without face-to-face meeting, it could possibly cause misunderstanding, sometimes my intention was even misinterpreted as offence.'

According to our research data analysis, 85.7% of the overall participants necessitated the face-to-face meeting in developing virtual relationship. Concretely, among this cluster of participants, about three fifths claimed face-to-face meetings ought to be

arranged as often as possible during the collaboration if budget permits. On the other hand, the rest two fifths considered physical proximity is only necessary in two particular scenarios: when a VT is at initial set-up phase, or when VT leader and members are not acquainted with one another.

'If the team's first meeting could be arranged face-to-face, it would be the shortcut to know individual team members, create effective team communications, and discuss conflict resolutions.'

'Face-to-face meeting would not be so crucial if we knew each other well or had collaboration experiences in the past. Otherwise, face-to-face meeting is definitely indispensable.'

'I consider face-to-face as the most effective communication way to glue our team member together. If budget permits, I would like to fly to meet my team members especially at the beginning of teamwork.'

Time Zone Diversity

Different time zones allow corporations to perform design and research work twenty four hours a day, seven days a week while allowing employees to work during their daylight work time in different countries. As the consequence, many VOs today are inclined to locate their researches or services in foreign countries as the work can be performed around the clock without the need for overtime pay or shift work.

However, time zone diversity has inevitably rendered time as a critical issue. The use of asynchronous technologies can alleviate different daylight working problems but still leave a gap between query and answer, which can be stressful and inefficient in time critical projects. One interviewee stated it was difficult to solve emergent problem and manage sustainable relationship between Finland and USA branches due to seven-hour time difference.

'The seven-hour time difference challenged me on solving emergent problems. For example, if I send an e-mail to my team member in USA this morning, I usually get reply the day after tomorrow! Although I can immediately reach the other end by using telephone call, but in order to avoid inconvenient time, I have to calculate their time before I dial the number.'

Moreover, since VT members are globally dispersed, it is not easy for e-leader to schedule the meeting for all members over different time zones. An electronic group calendaring or scheduling system can help the team leader to schedule in a more convenient way, saving time and effort in trying to coordinate team members' schedule.

'I try to optimize the time for everybody and avoid scheduling any of my team members to attend the meeting at midnight.'

'The collaboration between Finland and India can be managed since they are only three-hour difference. When we are in the morning, they are in the afternoon.'

'It takes time to fix a time. I usually give my team members phone calls to fix a meeting time. Sometimes I have to ask them to get up early to attend the meeting.'

Additionally, collaboration among different time zones has been remolding many e-leaders' working manners and styles. When leading team members resided in multiple time zones, e-leader accordingly strives to work around the clock:

'I know a guy who gets up early in the morning and cooperates with India from 6 to 9. Then he goes to work in Helsinki. After coming back from work, he starts to deal with USA from 5 to 8 in the evening. Indeed he is working around the clock.'

5.2.3 Strategies and Recommendations

Our analysis of VT comments identifies several leadership strategies useful for facilitating effective communications in virtual environments.

(a) *Effective team leaders should set clear visions to individual team members.*

Effective team leaders should formulate and further disseminate clear visions or goals amongst team members. They should also provide constant feedback regarding performance relative to these visions or goals. E-leaders should additionally be aware of the complex of sharing vision and value, which involves interpersonal communication, one-to-one interaction, and relational links.

(b) *E-leaders are suggested to provide feedbacks in a frequent and ongoing manner.*

Aiming to address the challenge stemming from communication, VOs or VTs need to engage in continuous communications over a wide range of CMCS. In order to eliminate the barrier breed by lack of face-to-face interaction, e-leaders must encourage their VTs to communicate in a frequent, ongoing manner but also constantly send feedbacks to team members. This can be accomplished through setting specific guidelines regarding meeting times, frequency, and specific agendas for discussion.

(c) *E-leaders should seek to establish specific rules of engagement that govern exactly how and when team members should communicate with each other.*

It is strongly recommended that during the team's first meeting, e-leaders should dedicate some time to setting a series of guidelines on communications such as meeting times, frequency, and electronic channels adopted. For example, a simple rule of engagement may state: "all online meetings will be scheduled in Hello Netmeeting Room according to Finnish time." Such policies, normally taken for granted in face-to-face settings, are extremely important in the virtual environment.

(d) *The importance of getting to know VT peers is vitally important to subsequent VT communication effectiveness.*

The requirements for e-leaders to concern and understand VT members are a consistent theme throughout the project. Team trust and cohesiveness can create a sense of unity, which can enhance communication effectiveness among VT members. This rationale is evident from many comments received from interviewees:

'Get to know your team members. The more you know about your peers, the easier to develop virtual relationship. I would recommend that the team as a whole meet on-line and have a chat session to learn about each other's personalities, cultural backgrounds, and work habits. This should help facilitate better communication over the life of the project and prevent miscommunications and unintended insults.'

These comments suggest that a very useful strategy in team building activities as a VT is initially created to engender a sense of trust, cohesiveness, and awareness of each other's differences.

(e) E-leaders are suggested to conduct periodic face-to-face meetings either through video conferencing or in actual face-to-face settings, especially during the set-up phase of VT or when they are not acquainted with each other.

As the play, some level of face-to-face contact is necessary either through video conferencing or in actual face-to-face settings. As long as budget permits, periodic face-to-face meetings should be built into project schedule so as to “increase e-leaders’ visibility, understand the challenges facing team members, enable the forming of interpersonal relationships between leaders and subordinates, increase team members’ appreciation of remote leaders’ difficulties and the building of social capital and trust” (Burtha & Connaughton 2004). Apart from meeting individual team members, face-to-face meeting should also aim to create effective team communications and discuss conflict resolutions.

(f) In order to schedule a session via synchronous technologies, e-leaders should elaborately negotiate time and availabilities with dispersed members.

Focusing on the example of arranging an on-line video meeting, e-leader has to negotiate meeting time and availabilities with all team members in advance. Additionally, to address the challenges posed by the mismatch in time zones, e-leader should avoid late nights or early mornings so that the meeting would be flexible enough to minimize the inconvenience for remote members. In case there is a conflict of scheduled meeting time, e-leader should necessarily organize extra meetings at another different time. Although heavy burden is laid upon e-leaders and efficiency may be deteriorated, such continuous negotiation and preparation are necessary and ineluctable.

(g) When using asynchronous technologies particularly e-mail to communicate with team members, e-leaders should reckon the gap between query and answer under varying cultural or habitual assumptions.

Aiming at high degree of efficiency, e-leaders should urge those members who take longer time or are reluctant to reply to an e-mail. Meanwhile, e-leaders can strategically allocate the tasks or arrange the progress of projects among team members in different time zones so that the project would be moved forward around the clock, resulting in the optimization of collaboration and maximization of efficiency. Take an information processing team comprises team members in Finland and USA for example. The e-leader may strategically assign the information collection task to Finland whereas appointing information analysis task to USA. When the Finnish team members are

heading home from a full day of work, their American teammates are just arriving at office. The USA team then can quickly enter the database and continue to work on the information collected several hours earlier in Finland. In this sense, work never stops but merely shifts to a different time zone.

5.3 Trust

Ultimately, leadership involves engaging people and directing them toward fulfilling a specific task or achieving a particular goal. At its core, leadership is about the development of relationships (Avolio & Kahai 2003), wherein trust is the framework upon which any relationship can be built (Moustafa-Leonard 2007). Without a high degree of trust, the virtual relationship will be extremely fragile and e-leadership is doomed to be eroded.

5.3.1 Trust Challenge

Trust installed within a VO can be classified into two segments, which are interpersonal trust and inter-corporate trust. Interpersonal trust is defined as the trust among individuals (particularly between a leader and his/her team members); whereas inter-corporate trust refers to the trust among corporation participants who collaborate within a VO.

Interpersonal Trust

The new breed of ICT facilitates a large portion of employees to work in virtual place and out of sight. As the consequence, “co-workers will no longer be down the corridor available for consultation at a moment's notice, and employees will no longer be able to look over all of their employers' shoulders in the traditional sense” (Aimee 2002). E-leaders thus have been perplexed on how to define absenteeism and how to manage members without seeing them.

Moreover, information is being circulated more widely than ever before, resulting in higher potential for unethical use of sensitive data. E-leaders have to become accustomed to working with and managing members who they do not often see but have access to vast amounts of confidential information.

In the absence of trust, some leaders or managers fully rely on computer software to electronically monitor subordinates (Asman & Essex 2001). However, misuse of computer monitoring can have severe consequences, such as a negative effect on employee morale, economic loss, the potential for unethical behavior (Furnell & Dowland 2000), and ultimately, the e-leadership effectiveness.

Inter-corporate Trust

For any VOs to work, it is necessary for the corporation participants to open at least certain parts of their internal business processes to one another. For example, a supplier of motorcycle parts needs to know where, when, what, and how much to ship to the motorcycle assembly plant if the supply chain process is expected to be efficiently automated. As a prerequisite, the assembly plant operator ought to publish all the information needed over the open communication networks.

The concerns on opening internal operations and private data might be trivial between long-established partners who have already created an essentially static VO; however, it is regarded as a major issue in the case of new or evolving partnerships, temporary associations, or a single transaction. It is difficult to convince these companies that the benefits outweigh the costs and to calm their concerns about exposing themselves on public medium, which many firms feel are less secure than paper contracts and handshakes.

5.3.2 Research Analysis

Our experimental study mainly focused on trust in VT settings. We divide trust in VTs into three sub-constructs: trust from team members in leader, trust from leader in his/her team members, and trust among team members. The interview participants were requested to identify which trust of the three categories is the most important for team performance. In addition, the interviewees were also asked to describe which leadership style (i.e. transformational or transactional leadership style) they were conducting as well as which one they consider more appropriate and effective for trust building in virtual context.

Trust in VTs

Clearly, all of these three sub-constructs of trust have significant impacts on team

performance. Grounded on the interview questions above, the participants’ responses to the most important sub-construct of trust are shown in Figure 5.

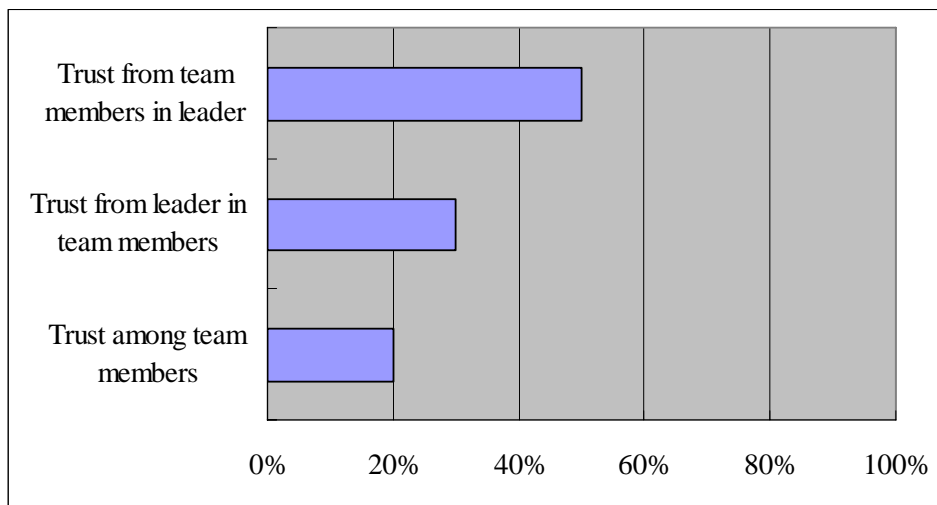


Figure 5. Interviewee’s responses to three trust sub-constructs

According to Figure 5, the majority of interviewees marked trust in leader as the most crucial factor for successful team performance. The following comments indicate the fundamental reasons to this perception:

‘Followers should trust the decision made by the leader. They should be convinced about the directions, orders, visions provided by leader. They should believe this is the best way to have things done. However, they should also be aware that leader can make mistakes. If they feel disagreed with me, they are free to discuss the problem with me. If their suggestion is better, I will adopt it. Overall, they should trust me at the first place.’

‘Only if my team members trust me can things be done. If they do not trust me, then it would be of high possibility to cause incoherence in our team. Eventually, the team itself will not exist.’

On the other hand, nearly 30% of interviewees identified trust from leader in team members as the key factor. They highlighted the importance of interdependence in VT peers.

‘As a virtual leader, I have to rely on what my team members say they are doing. I can’t

monitor all the time what they are doing because of the distance separation. I also have to trust them on their independent decisions concerning their own specialized domains.'

'To get the team performed, team members should trust the leader. On the other hand, as well to get the team performed, the leader should trust his/her team members. It is like the football game, in which the leader should trust the mates to fulfill their duties. It is the same with business.'

The rest of interviewees regarded trust among team members has more impact on team efficacy compared to the other two trust sub-constructs. Trust among team members was considered as a primary factor leading to team cohesion.

'My team members exchange projects and ideas between them. I have to make sure they trust each other to handover projects that can be best found, for example. Sometimes they also need to handover clients among them. If there was not trust among team members, my team would start to be leaking.'

Impact of Leadership Style

Both of transformational and transactional leadership styles have significant impact on trust in team leader, trust in team members, trust amongst team members, and team performance (Chuang 2005). Our experimental study aims to understand the clear role that leadership style plays in virtual context as well as the relationships among leadership style, trust, and team performance.

A majority of leader interviewees in our study identified transformational as the leadership style they were conducting and considered it as the most effective one for trust building in VT settings.

'Conducting transformational style will enable me to share the vision and value with my team members. It also facilitates to build the trust and develop virtual relationship in my team. Only by transformational style can team members be motivated and sparked.'

'From my point of view, it is wiser to conduct transformational style. Through this leadership style, I can exchange opinions and insights with my team members. Also, we can be mutually inspired and prompted. After all, I rely on my team members a lot.'

By contrast, a minority of interviewees claimed the transactional leadership style would be appropriate under certain circumstances.

‘People collaborating in the virtual environment are more interdependent than they used to be. Usually they are experts or specialists in their own areas. In some cases, we only cooperate for a short period of time. Thus it is very difficult to make them connected with leader’s vision and value. In this sense, reward system will do a good job when people collaborate by digging into their own areas.’

‘Although transactional leadership style seems to underestimate team members’ capabilities, it would function well if they are only in pursuit of money and rewards. Also it can act as incentive to stimulate people to achieve better.’

Overall, our findings suggest transformational leadership style has more positive impact on trust and team performance in VT settings compared to transactional leadership style. This finding also indicates that when aiming at building team’s trust and efficacy, transformational is more suitable than transactional leadership style.

5.3.3 Strategies and Propositions

Generally, our study results suggest e-leaders must leap from a control model to a trust method in order to build trust among virtual corporations or team members. The following strategies and propositions are elicited from research analysis.

(a) *Clearly, communication builds trust.*

Only through communicating with team members can e-leader calibrate them, get a better sense of them, and understand their priorities. In order to create a desirable trust atmosphere, e-leaders should strive to build constant communication and interactions with team members through team building and face-to-face or on-line video meeting. The amount of communication positively correlates with the degree of trust in VOs or VTs. In addition, while e-leaders proactively communicate with followers, team members will accordingly perceive the increasing amount of trust laid on them; as a reaction, they will correspondingly increase the amount of the trust they lay upon others.

(b) Commitments are necessary and important in sustaining trust.

Evidently, communication on its own is not enough to create trust in virtual environment. VO partners or VT members will trust each other only under the premise that every participant is acting in a predictably positive manner and effectively implementing its own task. In this sense, trust is only the positive face of predictability. In order to prevent negative face of predictability emerging, commitments should be necessitated in sustaining trust in VOs and VTs.

Being a VT leader, for example, he should fulfill his commitments to team members such as clearly understanding the challenges followers are facing, strategically segmenting complex task in a piecemeal fashion, and continually showing availability to followers. On the other hand, e-leader should take each team member's commitments as a directed obligation, clarify individual roles and responsibilities in the team, and supervise team members' progress and performance conforming to their own commitments.

(c) E-leaders should be constantly aware of trust inside the team, especially trust among team members.

Grounded on interview analysis, all participants highlighted the trust from leader to team members as well as trust from team members to leader, whereas considering trust among team members comparatively frivolous. In fact, trust among team members also has significant impact on team performance, thus requiring e-leaders' recognitions.

(d) Circumstance dictates which leadership style should be encouraged in VT environment.

E-leaders should be conscious that transformational and transactional leadership styles complement each other as the circumstance dictates.

Since transformational leadership style has more impact on team performance than transactional leadership style in most cases, team leaders may consider showing more transformational leadership style's behaviors in order to stimulate team's collective efficacy and upgrade team performance. On the other hand, although transformational leadership style is favored by most organizations, transformational leaders may resort to the transactional style especially when they aim at coining a double-win problem solving situation.

Hence, there is no specific formula or checklist to determine which style is more appropriate in any given situation. Often the best leadership derives from the mixture of these two leadership style.

(e) *E-leaders may consider circumstantially adopting “swift trust” with precaution.*

As a newcomer in trust lexicon, “swift trust” theory was coined by Meyerson et al (1996) to cater for those temporary VTs whose existence is formed around a common task with a finite life span. Such teams consist of members with diverse skills, a limited history of working together, and little prospect of collaborating again in the future. Severely, the tight deadlines leave little time for relationship or trust building.

While traditional conceptualizations of trust are strongly based on interpersonal relationships, swift trust strategy de-emphasizes the interpersonal dimensions and is grounded initially on broad categorical social structures and later on action. After the team has begun to interact, trust is maintained by “a highly active, proactive, enthusiastic, generative style of action”. Action strengthens trust in a self-fulfilling fashion. It will maintain members’ confidence that the team is able to manage the uncertainty, risk, and points of vulnerability, yet the conveyance of action has as a requisite the communication of individual activities (Meyerson et al 1996).

6 CONFLICT MANAGEMENT

Increasing business globalization and ICT innovation have led to the emergence of virtual structures in many organizations. Typically, VT members may come from different corporations or countries, aiming to achieve mutual understanding of culture differences and contribute their expertise to team projects. While team diversity is celebrated for stimulating creativity and improving problem-solving skills, it may also reduce team cohesion and cause conflicts.

Specifically, conflicts in VTs may be exacerbated by ineffective communication, time zone differences, culture diversity, logistic issues, and other factors due to space dispersion. These factors may hinder development of mutual understanding and virtual relationships within a VT. If poorly managed, conflicts can lead to ineffective teamwork and other negative outcomes.

Based on the above motivation, this chapter emphasizes the importance of conflict management in achieving effective VT outcomes. The experimental study will examine the influence of communication, culture difference, as well as age and gender diversity on team conflict and performance through analyzing conflict episodes. E-leaders can benefit from a better understanding of factors that trigger conflict as well as the possible effect of conflict on team performance. Knowledge of conflict attribution and effect can also help design related interventions to manage the causes and alleviate the negative outcomes of conflict.

6.1 Conflict and Resolution Types

Conflict is defined as both manifest and latent disagreements among team members and implies incompatible goals or interests (Robbins 1974). Conflict in teams can be broadly categorized into two main types: relationship and task (Pinkley 1990).

Relationship conflict has affective components such as tension and friction. It involves personal issues such as mutual dislike, personality clashes, and annoyance among team members. By contrast, task conflict reflects differences in viewpoints pertaining to team tasks. It includes differences about how task accomplishment should be proceed and issues of duty and resource delegation. It may coincide with animated discussion and personal excitement but is usually devoid of the intense negative emotions commonly

associated with relationship conflict (Kankanhalli et al 2007).

There are three common conflict resolution approaches: integrative (solving the problem through collaboration), distributive (solving the problem through assertion), and avoidance (ignoring the problem) (Sillars 1980). The integrative approach identifies and achieves outcomes that are satisfactory to all team members. The distributive approach yields outcomes that favor some team members against others. The avoidance approach occurs when team members avoid confronting the conflict and achieve no outcomes.

6.2 Conflict Episode Analysis and Synthesis

This section aims to analyze the conflict episodes described by interview participants and to investigate the influences of communication, culture difference, as well as age and gender diversity on conflict and team performance.

First of all, each interviewee was requested to identify which attribution among ineffective communication, culture difference, age diversity, and gender diversity caused most of the conflicts in his/her VT. Figure 6 illustrates their personal opinions toward this question.

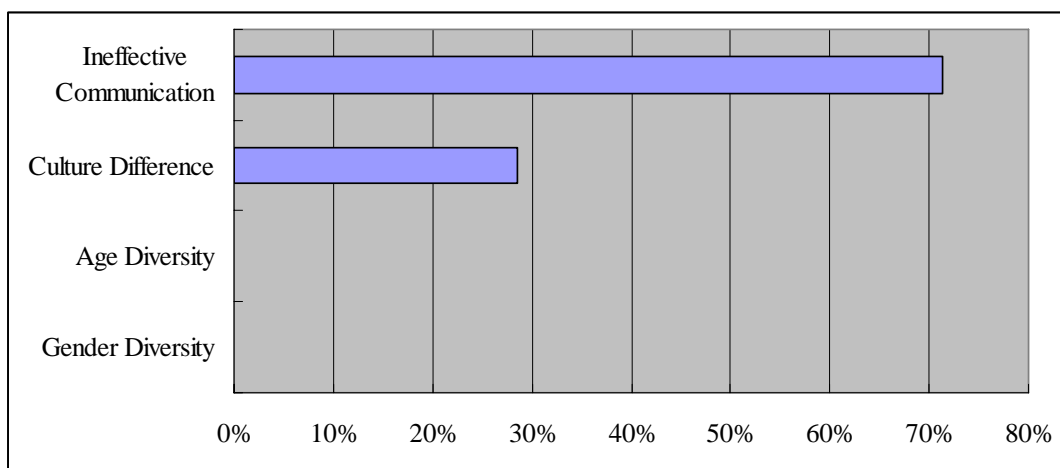


Figure 6. Major conflict attributions in VTs

According to Figure 6, the majority of interviewees marked ineffective communication as the main cause to VT conflicts, whereas the rest of them identified culture difference

as the major attribution. The interviewees were then asked to describe a conflict episode caused by each attribution. The following sub-sections will respectively analyze these conflict episodes and elicit relevant implications.

6.2.1 Communication Conflicts

Due to geographical separation, VT members communicate with one another by utilizing various technology tools. It was evident in our study that technology limitations and ineffective communication manners caused task or relationship conflicts in VTs and adversely influenced the team performance.

Immediacy of feedback, as one of the essential perspectives of communication, refers to message recipients giving rapid feedback on the information they received. The lack of immediacy of feedback in asynchronous communication can cause problems in development of mutual knowledge in distributed teams. Significantly, our findings indicate those VTs that relied on asynchronous technology tools experienced more task conflicts, which seemed to be more detrimental than traditional teams.

In one conflict episode described by interviewee, VT leader and team members never met face-to-face or gave each other a phone call. Instead, they exchanged information only by e-mail, which exceedingly delayed feedbacks. Moreover, the e-leader sent guideline via e-mails to his team members in short and ambiguous words; even worse, due to no acquaintance in this VT, e-leader seldom clarified these guidelines or dispelled his followers' misinterpretation.

'They failed in mutual understanding in each other or how the target should be achieved. This situation has continued much longer than it should. The project manager wrote e-mails one after another in order to solve the problem, not even trying to give a phone call or drop a visit. As it finally turned out, there was a severe conflict in the team and adversely affected the outcome.'

In this incident, when experiencing the communication conflict at the very beginning, the e-leader failed to recognize the conflict attribution or to provide continual feedbacks. This VT appeared to suffer from the use of avoidance conflict resolution approach to deal with their task conflict.

Another task conflict episode was breed from the technology characteristics and limitations. Due to the limitation of video conferencing, the efficacy of on-line sales meeting was compromised.

'We have monthly on-line sales meeting and we haven't found the best medium for that. We've been using Skype but it is of pretty poor quality. And it is also a problem about who is speaking particularly when there are 60 people on line or even more. It greatly affects our discussion progress compared to face-to-face meeting.'

Implication 1: Technology characteristics and limitations can lead to task conflict in VTs.

Implication 2: Lack of immediacy of feedback can lead to task conflict in VTs.

Implication 3: Avoidance conflict resolution approach may result in low team cohesion and performance.

Due to the unrestrictive access to information, e-leaders should not only prudently disseminate information but also communicate information evenly among all the team members. In one conflict episode, e-leader neglected to send project information to all his team members at the same time, thus causing relationship conflict.

'One of my team members got uncomfortable and upset because he heard this information from others instead of me. He might think why I wasn't the person that told him the information. As a result, he showed mistrust against me and became suspicious. It was my lapse though, he took it too personal.'

According to this interviewee's description, failure to communicate information evenly has caused relationship conflict within his VT. Although the e-leader explained his oversight using distributive conflict resolution approach, the team member still felt discriminated from others.

Implication 4: failure to communicate contextual information or to communicate information evenly can lead to relationship conflict in VTs.

Implication 5: Distributive conflict resolution approach may result in low team cohesion and performance.

Another conflict episode stemmed from large volumes of e-mail being exchanged throughout the project. Information overload in e-mail communication led to this conflict episode involving task conflict. A VT member noted:

'I remember the other day I sent e-mail to the whole team, proposing a new way to structure our project. After two e-mail requests, I had received no answer from anyone. Everyone ignored my message.'

This was considered as an episode of task conflict triggered by technology characteristics. Conflict attribution was personal because the team member blamed his teammates for not responding. Conflict resolution approach was distributive since the team member was ignored by his teammates.

Implication 6: Information overload can lead to task conflict in VTs.

In conclusion, our findings suggest six types of ineffective communication manners in VTs:

- Technology characteristics and limitations
- Failure to communicate contextual information
- Failure to evenly communicate information
- Different speed in information access
- Information overload
- Interpretation of the meaning of silence

The causes of the problems cited were the geographic dispersion of team members, the information overload, and the slow rate and feedback lag of communication media. In addition, information overload is a consequence of large volume of communication, which has increased in the context of electronic communication.

6.2.2 Culture Conflicts

As the organizational trend, the work of organizations and leadership has become increasingly global. As a result, VOs' divisions and subunits as well as customers, stakeholders, and suppliers may extend worldwide. Today many e-leaders are interacting with and VT members at different corporations, industries, or even countries.

However, team members with differential culture background may tend to certain biases, assumptions, or views of the world (Kayworth & Leidner 2000). If not being reconciled, these differences can disrupt situational awareness, decision making, coordination, and communication in multinational coalitions (Klein et al 2000).

E-leadership has been confronted by all the segments of cultural differences including linguistic and national differences. Since cultural values reflect and are conveyed through language during communication, linguistic diversity typically entails cultural diversity and vice versa.

Linguistic Differences

The linguistic difference is underscored when team members come from different nations and have more than one dominant language. The following conflict episodes reinforce this link between linguistic diversity and conflict in VTs.

‘There are some problems with understanding the English from certain countries. For example, when dealing with partners in Russia, there are some language barriers in demonstrating the project in English. This problem is representative for our partners who do not speak fluent English.’

‘My team consists of local partners and foreign team members. When sending e-mails to all of them, I have to write two versions, English and Finnish. Apparently it takes me more time to construct an e-mail.’

‘Swedish members would break off into Swedish, Finnish-speaking members would communicate in Finnish, and English-speaking members would converse in English. Since I can speak all of these languages, I have to do the translation work all along the meeting. Whether such use was intentional or not, it reinforced language division among team members.’

Another language-related problem was due to more fluent usage of English by native speakers. Native English speakers dominated the airtime during conference calls and face-to-face meetings at the expense of other teammates. Linguistic diversity thus has been outlined as an important aspect of cultural diversity.

Implication 7: Linguistic diversity can lead to task conflict in VTs.

National Differences

Hofstede (1991) classified the national culture differences into five bipolar dimensions, which are power distance, uncertainty avoidance, individualism, masculinity, and long-term orientation. Power distance is the extent to which people expect and accept that power is distributed unequally. Uncertainty avoidance concentrates on the degree that people feel threatened by uncertain or unknown situations. Individualism implies belief in the primary importance of the individual as opposed to the group. Masculinity concerns about cultures in which social gender roles are distinct. Long-term orientation is the degree to which people's efforts are focused toward the future rather than the present.

Conflict episodes due to different culture dimensions (individualism versus collectivism) were witnessed in our interviews. People from an individualistic culture tend to value personal time and the freedom to adopt personal approaches to their work. Conversely, people from a collectivistic culture tend to value team identity and the presence of team standards for carrying out their work.

In one episode for example, team members disagreed about a peer appraisal scheme, which let team members rate each other in order to determine who should participate in the presentation. Members from collectivistic cultures (China) were uncomfortable about rating their teammates, whereas members from individualistic cultures (Finland and the United States) felt that the peer appraisal scheme was appropriate. The opposing subgroups argued about the merits and demerits of the scheme, but neither group changed their position. Eventually, the appraisal scheme was implemented. This was considered as an episode of task conflict caused by cultural diversity. Conflict resolution approach was distributive because one subgroup prevailed.

Implication 8: Individualism can lead to task conflict in VTs.

Implication 9: Individualism influences cooperative behavior of individuals in a group and is likely to be the most important distinguishing feature of national culture.

Moreover, several interviewees had perceived the cultural differences in working style between European and Asian colleagues. When collaborating with each other, Europeans endeavor to detect and solve as many problems as possible prior to

implementation, whereas Asian wait-and-see approach is to fix problems only when they arise. Additionally, Asians seldom challenge people in public; instead, they choose conflict avoidance or gentle coaxing. The following comments demonstrate the national differences among VT members.

'French people usually do tasks according to the priority task lists. When a new task comes, if it's of high priority, they'll settle it down immediately; otherwise, they will see to it after current task is done. By contrast, it seems that Indians are not willing to say 'No' to you. Instead, they always say 'OK'. No matter the new coming task is of high or low priority, they will interrupt the current job and see to it immediately as the leader told them so. This has caused a disorder of jobs or tasks.'

'I am not sure my Chinese colleague was too shy or just disliked frequently communicating with us. He worked on his own and seldom turned to us for any advises or feedbacks. When he had finished his task segment, we were sorry to find out that his work was inconsistent with ours, and as a result, we had to return his work. I hope next time he would exchange his idea with us at each step.'

The above descriptions were considered as episodes of task conflicts in VTs. These highlighted differences in work ethic between Europeans and Asians demonstrate that culture difference is rooted into an individual's ideology and behavior. With regard to multi-cultural teams, it would be preferable and advisable for e-leaders to adopt different managerial and relational strategies to reconcile cultural diversity.

Implication 10: Cultural diversity in working style and ethics can lead to task conflict in VTs.

Implication 11: If not reconciled, different working styles and ethics can adversely influence team performance.

Moreover, national diversity gives rise to conflict when team members of one nationality have negative feelings toward their teammates of other nationalities. Ethnocentrism (belief that one's own nationality is superior), prejudice (unfavorable perception of people from other nationalities), and stereotyping (exaggerated generalization of attributes about people from other nationalities) are three traits related to national diversity that hamper communication in VTs (Kankanhalli et al 2007). These traits contributed to conflict episodes were also observed in this study.

'The American and Indian members had a tiff when they met face-to-face. Other team members joined in to support their respective sides. However, they eventually resolved the conflict amicably by agreeing to focus on their project.'

This was considered as an episode of relationship conflict caused by national diversity. Conflict resolution approach was integrative because the conflicting parties decided to focus on a common goal that was important to the team.

Implication 12: Cultural diversity can lead to relationship conflict in VTs.

Implication 13: Conflict resolution approach can moderate the relation between relationship conflict and team performance in VTs.

Implication 14: Integrative conflict resolution approach appears to be most suitable for resolving strategic problems, whereas the distributive and avoidance approaches appear to be less suitable.

In conclusion, VTs experienced much more conflicts due to culture diversity (including national and linguistic) than traditional teams. Culture diversity has been found to induce both task and relationship conflicts in VTs, thus requiring e-leaders to bear awareness and consciousness of these differences.

6.2.3 Age and Gender Conflicts

Social identity theory (Tajfel & Turner 1986) posits that people like to be affiliated with others in the same social category including age and gender. Hence, age and gender diversity can potentially create fault lines or conflicts. In our study, only a few conflict episodes revealed age and gender diversity as conflict attributions.

A small group of interview participants had witnessed conflict episodes arising from age diversity. Significantly, the older team members have a different work schedule from the younger team members. The younger generation prefer to race with deadlines, whereas the older team members are inclined to adjust their schedules prior to deadlines. This resulted in scheduling conflict within the team.

'One of my peers who is older than me once said he couldn't understand why this young generation likes working late just before project deadlines. It made him annoying

because he could not get younger colleagues' work parts until the deadline.'

Implication 15: Age diversity can lead to task conflicts.

Implication 16: Integrative conflict resolution approach can be effective for resolving team conflicts caused by scheduling diversity.

Moreover, the interviewees also described a particular scenario that happens when leader is younger than team members. It is possible that team members would consider their leader less capable and inexperienced as long as they realize the leader is younger than most of them. Radically, team members may show distrust against their leader. The following two conflict episodes demonstrate how age diversity deteriorates the team cohesion.

'I am actually 23 years old, younger than most of my team members. However, I pretend to be 27 years old as I claimed. If they knew my real age, they probably will not believe I am mature and experienced enough to lead them. I had this kind of bad experiences.'

'I once had a team member who is twice older than I am. Frankly, I could hardly lead this person. He didn't trust me much but suspect my decisions. Rather, he worked independently without any collaboration.'

In the first incident, this e-leader adopted distributive conflict resolution approach because she hid her real age through assertion, thus alleviating the possible conflicts. The conflict resolution approach in the second incident was also distributive because an individual rather than a subgroup was blamed for the conflict and one party prevailed over the other. Both of incidents were considered as episodes of relationship conflicts caused by age diversity.

Implication 17: Age diversity can lead to relationship conflicts.

Implication 18: Distributive conflict resolution approach may be effective for resolving team conflicts caused by age diversity.

Gender diversity reflects female and male differ from each other in values, morals, insights, and behaviors. In our study, fewer interviewees had experienced conflict

episodes due to gender diversity. In the only episode, a female team member criticized her male leader for inappropriate behaviors and attitudes toward her.

'When she blamed me for not willing to work with her, it was a huge surprise to me because I didn't have anything against her. I had better be aware that the thinking process is different between female and male in order to achieve organizational cohesion.'

There were few such conflict episodes possibly due to the fact that employees are increasingly adjusted to a mixed-gender workplace and due to the presence of more salient intra-team diversity (cultural diversity) in the team.

Implication 19: Gender diversity can lead to relationship conflictions.

Implication 20: Integrative conflict resolution approach is the most suitable for resolving team conflicts caused by gender diversity.

6.3 Conflict Managerial Strategies

Compared with a neighborhood team, a VT is inherently more difficult to sustain and requires more energy to manage particularly when team conflict occurs. In order to achieve team consistency, cohesion, and effective leadership, e-leaders should be able to manage team conflicts and to evolve mechanisms and norms to address such conflicts.

The previous section has analyzed the conflict episodes described by interview participants and elicited relevant implications. Furthermore, this study attempts to shed some light on how to strategically manage conflicts in VTs. Before team members start to collaborate, it is prerequisite and critical to build the cohesive relationship within a VT so that the potential conflicts may be avoided. Grounded on social strategy for relationship building, this section proposes a three-step model for e-leaders to develop relationship with team members. Furthermore, this section also offers a group of suggestions for managing conflicts in VTs based upon results of this study.

6.3.1 Leader-initiated Relationship Building Tactics

VOs in different industries have increasingly emphasized the need for e-leaders to build personal relationships with their team members in advance to any task proceeding. Accordingly, this sub-section proposes a three-step model (Pauleen 2003) for building virtual relationships in VTs. Figure 7 illustrates a cognitive model of leader-initiated relationship building with VO partners or VT members.

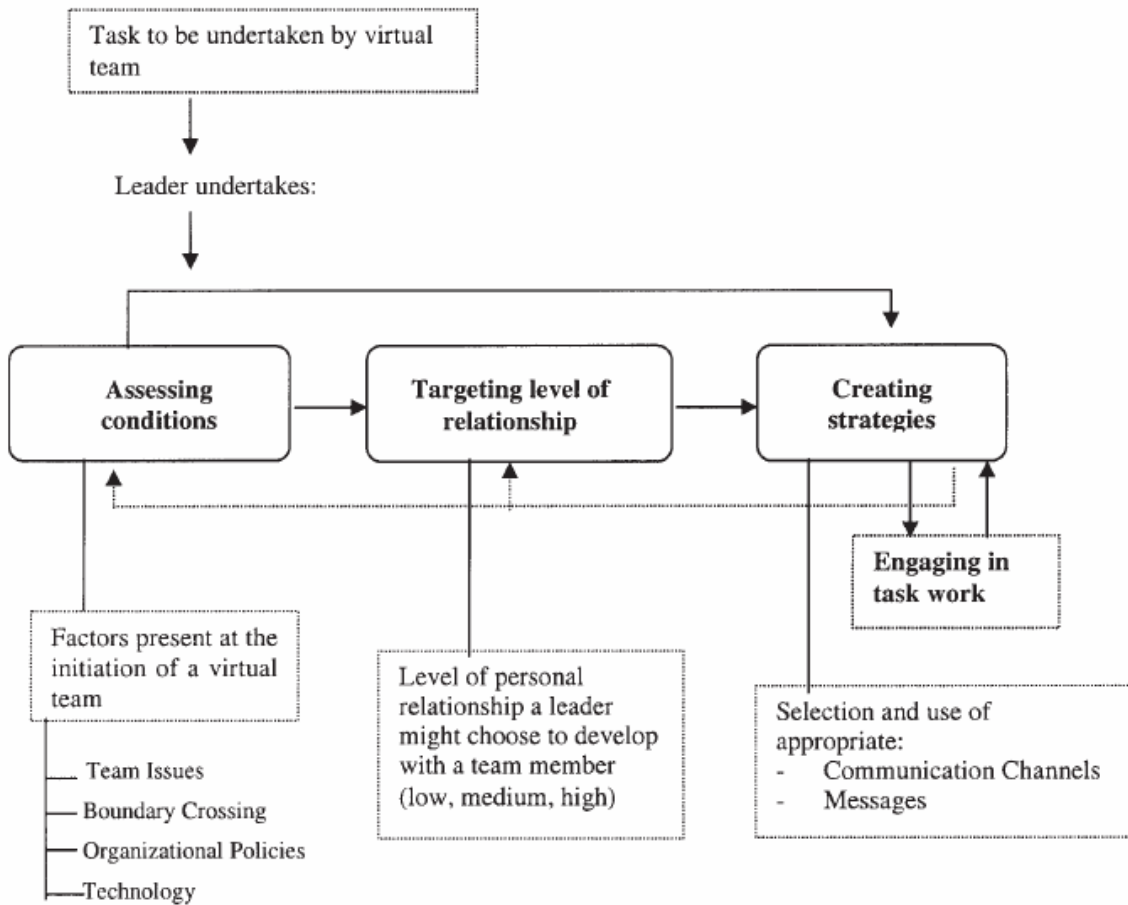


Figure 7. Three steps in building virtual relationships

(Source: Pauleen 2003)

According to Figure 7, this model partitions the overall virtual relationship building process into three steps, which are assessing conditions, targeting levels of relationship, and finally creating strategies. The following subsections will extensively introduce the basic features and propose the corresponding leadership tactics at each step.

Step One: Assessing Conditions

In this step of assessing conditions, e-leaders ought to consider all the situational factors when undertaking a project or task. Based on a variety of circumstances, these factors present themselves as task complexity and team formation, boundary crossing, organizational policies and resources, and technology. It is crucial for e-leaders to carefully pre-screen all these factors and audit their potential impacts at the initiation phase of VT. Without prudent assessments, e-leaders could barely apprehend any attributions to team conflicts.

Task Complexity and Team Formation

A vital consideration for the leader is to examine the nature of the VT's project goal and its complexity, as well as the time frame for completion (Evaristo & Scudder 2000). Apparently, simple task and short time frame will require lower level of relationship building than complicated task and long time frame.

Another important issue refers to how team members are selected to form the VT. Being volunteer or appointed may greatly influence the overall willingness of an individual to contribute to the team, and may hence require different levels of relationship building by the leader. Likewise, the experience an individual possesses also determines the level of relationship building needed. Those with little or no experience may require a greater degree of relationship building from the leader.

Boundary Crossing

As illuminated in section 2.5, VT can effectively comprise members from different departments, organizations, industries, or even nations. These background or cultural differences pose great challenges to team cohesion, process, and ultimately outcomes. Therefore, a leader should prudently assess the entire conditions of boundary crossing and further endeavor to remove specific barriers before choosing an appropriate level of relationship or creating related strategies.

Organizational Policies and Resources

Organizational policies and resources have a major influence on how a leader builds relationships with team members (Pauleen 2003). Without a cohesive and coherent policy regarding the use of VTs, organizations will be fettered by chains instead of cohesively collaborating among participants.

For example, HR policy, as a typical subcategory of organizational policies, has a great influence on team member's enthusiasm and competence. If the HR policy is not harmonized for a VT, there clearly will be an economic disparity, which could negatively impact on a leader's efforts to recruit and lead the team, or to build relationships with team members. Such inharmonic policies can result in a two-tier team, causing the rust of incentives for VT members to strive. Hence, e-leaders should soberly analyze the potential harm caused by incohesive organizational policies.

Furthermore, e-leaders should also be aware that organizational resources may affect the process of relationship building. For instance, with abundant financial resources, mammoth enterprises are capable of affording ICT groupware needed to support VTs, as well as HR practices such as recruitment and training which can develop virtual members' capabilities. In contrast, for those small companies, financial limitations often play a significant part in the resources that e-leaders have at their disposal (Boutellier et al 1998).

Technology

The availability and compatibility of ICTs being used as well as followers' competence in using these ICTs influence the process of facilitating virtual relationships, particularly when organizational or national boundaries are permeated (Pauleen 2003).

Although virtual members' competence or preference in using various ICTs can be improved through organizational training, e-leaders can avoid the potential technology inconsistency among team members at member selection phase, as different people have differential psychological favor or dislike for certain communication channels.

Step Two: Targeting Level of Relationship

Level of relationship in team context mainly refers to the appropriate level of personal relationship between a leader and followers (Pauleen 2003). It has been widely recognized that targeting personal relationship level is a prerequisite for constructing a cohesive and consistent VT atmosphere.

In order to determine the appropriate level of relationship, a leader should not only examine all the conditions presented at the start-up of VT, but also ground on his/her personal experience of what degree of proximity with team members would be optimal

in order to achieve the objective. Precisely, this step identifies three different levels of relationship for leaders to choose, ranked as low, medium, and high.

A low level of relationship refers to the basic level of goodwill available at the start of a VT. Such relationship level latently indicates that VT members are able to accomplish tasks without developing any personal relationship in advance. However, such relationship and trust appear to be temporary and fragile.

A medium level of personal relationship is defined as enough familiarity to build effective mutual communication between a leader and his/her followers. At this level of relationship, effective communication skills enable the leader to gain an thorough understanding of his/her team members, leading to various benefits such as less attribution bias, increased morale, better decisions, and ultimately a successful team outcome. It is very likely that leaders will find this level of relationship the most commonly required in VTs, since sufficient communication is fundamental to effective VT processes and outcomes (Lau et al 2000).

High-level trust relationship is necessarily required particularly when VT is undertaking complex tasks that crossed multiple boundaries. However, there is a contradiction between adequacy of time needed to achieve this level and the deadline-driven attribute of VTs. As endemic in many VOs or VTs, time famine inconsistency presents a significant challenge to e-leaders. Consequently, e-leaders are often facing a difficult dilemma of the time and effort needed to build effective virtual relationships particularly when multiple boundaries are crossed.

Table 4 delineates the definitions of low, medium, and high level of relationship in the team context.

Table 4. Levels of relationships in virtual teams

(Source: Pauleen 2003)

Level of Personal Relationship	Definition
Low	Just enough to get the project or task completed, such as name, position, company, and so on.
Medium	A level appropriate for building effective two-way communication resulting in project or task completion; for example, varying amounts of personal information based on the individual needs of the leader and team members.
High	An appropriate level of trust resulting in project or task completion; for example, a much more intense level of personal and professional involvement may need to evolve over time.

Step Three: Creating Strategies

While e-leadership strategies can commonly refer to diverse aspects, this step will solely aim at creating strategies on building targeted level of relationship.

Before creating or implementing relationship-building strategies in virtual context, the selection and use of appropriate communication channels and message content would be the first task on priority list. The selection of appropriate communication channels is grounded on those conditions discussed in Step One as well as the level of personal relationship chosen in Step Two. Having selected the appropriate communication channels and message contents, e-leaders should then determine diverse electronic channels for different situations. For example, e-mail would be an effective vehicle for task description, whereas video conferencing allows receivers to feel the actual presence of the communicator, thus leveraging communication effectiveness.

After drafting the strategies, the leader should move into the strategy implementation and management phase. Once the targeted level of relationship is achieved as well as the created strategy is proved to be practical and rational, then the relationship building process has been successfully conducted, and yet leaders should continue to manage and maintain the relationship as necessary.

However, time is not sufficient for a leader to thoroughly assess the conditions or build high level of virtual relationship in a complex long-term project. Accordingly, it would be advisable for e-leaders to create strategies before undertaking the task but strengthen the relationship concurrently with undertaking project or task.

Noticeably, the relationship-building process ought to be reconducted once if the created strategy fails to achieve the projected outcome or the original conditions have been changed. In addition, if any newcomers join the team, the leader should repeat the whole relationship-building process on each new member.

6.3.2 Suggestions for Practice

In order to eliminate the potential factors for conflicts, it is strategic for e-leaders to build virtual relationship before collaboration. Furthermore, the interview analysis also elicits relevant suggestions for enhancing cohesion and managing conflicts in VTs.

(a) The causes of task conflict and relationship conflict can be identified and made known to team members through training.

E-leaders can examine their team diversity to identify potential fault lines from their inceptions so that they can steadily evolve mechanisms and norms to deal with such differences. During their collaboration, better awareness of diversity and its implications can evidently lead to better adjustment behaviors. For example, differences in assumptions between individualistic and collectivistic cultures can be highlighted to team members so that they can better appreciate the perspectives of their teammates. Likewise, differences in thinking process between technical-background and business-background members can be frankly discussed so that mutual understanding and consensus can be achieved.

(b) E-leaders need to be aware of communication technology effects.

Communication technology effects such as large volume of electronic communication and lack of immediacy of feedback may cause conflicts. As the remedy, advanced communication technologies including group calendar systems may overcome information overload problems. Furthermore, it may alleviate the conflicts due to lack of immediacy of feedback by organizing periodic conference calls for synchronization and establishing norms for responding to e-mails and web postings.

(c) E-leaders should be aware of the potential conflicts resulting from team diversity and the performance effects of conflict.

Where possible, team diversity can be minimized through appropriate selection of team members when the team is likely to work on a high interdependence task.

Take culture diversity for example. As the maneuver, e-leaders need to constantly be aware and conscious of cultural distinction among team members, and realize coordinating culture differences is a complex but crucial process, thus requiring a significant amount of time and communication. When harmonizing team members with differential cultures, e-leaders should strive against any lurking pre-judgments and prevent cultural diversity from being patternized. Furthermore, as cultural sensitivity is subtle, e-leaders should always take cultural differences into account when optimizing intercultural communication manner.

In addition, VO or VT leaders can strategically solve potentially adverse effects of cultural diversity through promoting a dominant organizational culture to the employees, thus harmonizing the team diversity and inosculating all the employees into a common organizational value or culture.

(d) E-leaders should be cognizant of the relationship between conflict attribution and conflict resolution approaches as well as the effectiveness of various conflict resolution approaches.

Our study suggests the integrative conflict resolution approach is most effective for resolving situational conflicts. However, VTs may resort to the distributive conflict resolution approach if they are required to rapidly solve task conflicts in order to meet deadlines. Distributive approach is typically used when there is personal conflict attribution (attribution that blames the problem on the characteristics or behavior of individuals).

Noticeably, both integrative and distributive approaches in virtual settings appeared to facilitate and improve team performance, whereas the avoidance approach seemed to hinder team performance and even intensify the confrontation, thus is not encouraged to be adopted.

7 DISCUSSIONS

The growing popularity of inter-corporate alliances combined with a growing tendency to flatter organizational structures has highlighted the need for firms to permeate traditional organizational boundaries and collaborate on a worldwide scale. Consequently, VOs and VTs have been heralded to assist firms in removing time or place barriers, optimizing resource sharing, and actualizing the competitive advantages in this new work context inherent with high degree of challenges and complexities.

Among various key aspects of VOs/VTs, this study provided rich insights of e-leadership through investigating leadership challenges, effectiveness, and strategies. Through these insights, we have been able to articulate a set of critical success factors for effective leadership in VOs/VTs. Although the major domains of e-leadership such as communication, trust, and culture are equally important in both face-to-face and virtual settings, some of the challenges within these domains are unique to the virtual environment such as misinterpretation and misunderstanding of message contents, time gap between inquiry and response, as well as distrust due to physical absence.

More significantly, the solutions at the disposal of leaders to address these challenges are different in the virtual environment from the traditional face-to-face. In face-to-face environments, increased monitoring and frequent mutual discussions with various members can be implemented to achieve the leadership effectiveness; in contrast, much of the control and reward capabilities of the leader are reduced in the virtual environment, thus requiring e-leaders to create inventive solutions to address emergent problems and conflicts.

Limitations and Extensions

Before making any general conclusions or recommendations, it is necessary to address several limitations of this study and elicit future studies.

The main limitation of this study is the sampling method. As this study focused on leadership, the majority of research participants selected were leaders, whereas only a small sample size of team members participated in the experimental study. Consequently, our findings mainly grounded on the e-leaders' feedbacks, which could

be partial and limited. As the complement, future extensive study may elicit more followers' opinions about the current leadership status and how to improve the leadership in their respective VTs. The future study can also examine the differences in assessing leadership status between leader and followers from the same VT.

Moreover, our study results were only based upon two involved companies, NRC and Talentor. As the consequence, all the participants may be influenced by their respective organizational culture or vision. This sampling limitation may restrict our ability to generalize these results to other VOs or VTs. It is preferable if individuals from diverse companies could participate to assess the leadership effectiveness in the future study. However, this ideal sampling method might pose great challenges to practicality and feasibility.

In addition, the characteristic nature of the participating individuals might have directly impacted on the scope of this research. The research participants came from different market segments and their respective VTs spanned vastly different. Based on the diversity of these teams, it is difficult to determine whether the current findings were grounded on which one of these distinguishing traits, or possibly even the interaction between them. Future studies may seek to identify how the characteristics of e-leadership vary across a variety of personal traits and cultures. Concurrently, future research can also seek to identify underlying factors of e-leadership that are universal in nature and transcend individual's traits and culture.

A final reservation centers on the survey instrument and particularly the items used to define the predictor variables and main criteria scales. Due to the comprehensive nature of the survey, the instrument was designed to address several variables. Based on this intent, some of the scales designed to assess the predictor variables may be insufficient to provide full-scale data. For instance, the limitations of technology tool scales contain only two items, which were e-mail and video conferencing.

Conclusions and Propositions

Although these limitations may impact the ability to generalize the findings of this study, several conclusions are still warranted. First of all, the research was successful not only in determining a number of critical success factors for e-leadership effectiveness but also addressing the relevant strategies. Since the participants came from different departments, companies, and geographic settings, the results were fairly generalizable

for an exploratory study.

According to the research analyses, e-leader ought to prompt followers connected with his/her vision and value, achieve efficient interaction, establish positive team processes, develop supportive team member relations, and select only those team members who are qualified to do the work. These aspects exhibit strong associations with e-leadership strategy and clearly constitute a comprehensive set of best practices for designing and leading VTs.

E-leaders should be aware that VTs require supplementary relational links between team members because of the lack of physical proximity. A set of specific efforts should be targeted towards high degree of trust and cohesion within VTs. Specifically, e-leader should carefully pre-screen all the conditions such as task complexity and team formation, boundary crossing, organizational policies and resources, and technology at the initiation phase of VT, but also target the appropriate level of relationship ground on his/her personal experience of what degree of proximity with team members would be optimal in order to achieve the objective.

Furthermore, e-leadership strategies specific to virtual teaming must address several communication barriers. Content analysis of the participants' narrative responses to questions suggested more consideration of communication patterns and manners. Many of the participants emphasized the need for more personal contact to establish supportive team member relations and to improve team performance. Therefore, e-leaders may consider utilizing more face-to-face interaction and other group communication technologies such as group telephone and video conferencing to enhance personal connections with team members.

In addition, many interview participants claimed how to solve team conflicts and emergent problems is the greatest challenge associated with virtual context. We accordingly suggest e-leaders to examine their team diversity to identify potential fault lines from their inception beforehand so that they can steadily evolve mechanisms and norms to alleviate these conflicts or problems. Besides, the causes of task conflict and relationship conflict in VTs should be identified and made known to team members through training.

Based on the results of this study, organizations choosing to implement VTs should

recognize that VTs differ substantially from traditional co-located teams, such as how a team is formed, how to effectively communicate via ICTs, and how to lead team members towards cohesive collaboration. Evidently, these differences along with e-leadership strategy and working capability in VT settings can be illuminated through diverse training programs. However, most of organizations only concentrate on training managers to improve leadership qualities but despise the significance of improving employees' capabilities of working in the virtual environment. Grounded upon participants' narrative responses from NRC and Talentor, only training programs catering for managers were currently explicitly performed ("Inspiring Leader" in NRC; "Academy & Simulation" in Talentor). In fact, the followers' capabilities of working under virtual environment were not as simple as being able to use e-mail or on-line chat but covering a wide range of VT aspects such as circumstantially adopting different communication patterns, realizing the culture differences in working styles and manners, and maintaining high degree of trust among team members. Hence, these organizations should focus much more of their efforts on training not only leaders but also followers to improve capability of working in the virtual environment so that VTs' efficiency and effectiveness can be reinforced as a whole.

A caveat of our study is that although the results from the investigation could apply to a larger population of all existing VOs or VTs, it is also possible that specific circumstances require particular attention to be paid to any one of the best practices. E-leaders will barely know which of these recommendations from this study are best suited to designing and supporting effective VTs across different situational contexts until they begin implementing these practices in a given situational context.

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APPENDIX 1. Interview Questions

Open Ended Questions in Interview Session

Section 1. Technology

1. What are the first three technology tools you used most frequently and commonly to communicate with your team members?
2. Except for these three tools, what are the other tools you ever used in your team?
3. (Since you ranked *Email* as the most frequently used technology tool), how effective is *Email* when you communicate with your members? Do you feel *Email* is limiting your ability to effectively manage projects with teams that are geographically dispersed?
4. Video Conferencing
 - How often do you use it?
 - How effective do you think is video conferencing?
5. Based on communication with team members, how do you think current technologies can be improved? Any suggestions?

Section 2. Communication

1. When you send feedbacks to team members, which technology tools do you use?
2. As a leader, do you have a planned strategy to provide regular feedbacks?
3. Based on your experiences, what is the greatest challenge for effective communication between team leader and team members due to physical absence of team members?
4. Do you think face-to-face meeting with your virtual team members is necessary? Why?
5. How did you manage time zone differences?

Section 3. Trust

1. Based on your experience, which do you think is more important for team performance? Trust from members in team leader, trust from leaders in members, or Trust among team members? Why?
2. Which leadership style do you conduct, transformational or transactional? Why?

Section 4. Conflicts

1. Can you describe some conflicts in your team due to ineffective communication?
2. How did you solve the conflict?
3. Do you think this conflict influenced the team performance (task or relationship)?
4. Can you describe some conflicts in your team due to cultural difference?
5. How did you solve the conflict?
6. Do you think this conflict influenced the team performance (task or relationship)?
7. Can you describe some conflicts due to age difference?
8. How did you solve the conflict?
9. Do you think this conflict influenced the team performance (task or relationship)?
10. Can you describe some conflicts due to gender difference?
11. How did you solve the conflict?
12. Do you think this conflict influenced the team performance (task or relationship)?
13. Among communication, cultural differences, age and gender diversity, which causes most of conflicts?

Epilogue & Closure

1. To conclude, what is the most challenging issue associated with a virtual environment?

2. Is there an effective training program within your company to train.....

(i) employees to improve capability of working in the virtual environment?

(ii) managers to improve leadership qualities?

If yes, then could you describe about those training programs?

APPENDIX 2. Survey for Leader

On-line Survey for Virtual Team Leaders

Section 1. Basic Information

1. Gender:

- ☐ Male
- ☐ Female

2. Nationality:

3. Your Title or Responsibility in company:

4. The virtual team you participated/are participating mainly focuses on:

- ☐ Product Development & Design
- ☐ Performance Testing
- ☐ Manufacture Development
- ☐ Marketing & Sales
- ☐ Customer Services
- ☐ Management & Administration
- ☐ Information Integrity
- ☐ Consultation
- ☐ Other (specify)

5. Number of team members:

6. The coalition of your virtual team is:

- ☐ Temporary
- ☐ Permanent

7. In your virtual team, have the team members been changed?

- ☐ Original members are not changed.
- ☐ Only a minority of members are changed.
- ☐ Almost half of original members are replaced.
- ☐ Majority of members are changed.
- ☐ All the members have been changed.

Section 2. Information and Communication Technology (ICT)

8. Among the following technology tools, which three technology tools do you use most frequently and commonly? Number 1, 2, 3 to rank them.

	E-mail		Wikis
	Telephone Call		Weblogs
	Voice Mail		RSS
	Fax		Web Services
	On-line Chat		Social Bookmarking
	Video Conference		Flash Meeting
	Group Telephone Conference		On-line Whiteboard
	Standard/Express Mail Delivery		Application/desktop Sharing
	Internet Forum/Discussion Boards		Task Lists
	Intranet		Mind maps
	Extranet		File and Documents Sharing
	Web 2.0		Semantic Web
	Other (specify):		

9. Do you use Video Conferencing to communicate with your team member? If so, how often do you use video conferencing to organize online meeting?

- ☐ Once a week
- ☐ Once to twice a week
- ☐ Once every two weeks
- ☐ Once a month
- ☐ Seldom
- ☐ Never
- ☐ Other (specify)

10. Do you ever feel Email or Video Conference limits your ability to effectively manage virtual team? Please determine the effectiveness of email and video conference, respectively. *10- highly effective, no limits; 1- not effective, always limit my ability.*

	10	9	8	7	6	5	4	3	2	1
Email	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Video Conference	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. To what extend do you think face-to-face meeting is necessary for virtual team relationship building? *10-very necessary; 1-very unnecessary.*

	10	9	8	7	6	5	4	3	2	1
Face-to-face Meeting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section 3. Communication in Virtual Team

Virtual Team Formation

12. The following questions mainly focus on specific information about how your virtual team was formed. *5: strongly agree; 1: strongly disagree*

	5	4	3	2	1
Team members were selected based on their individual talents and abilities to contribute to the team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When selected, team members were technically competent with the technology tools we use to perform our work and interact with one another.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have provided sufficient information to team members in order to let them understand the team's purpose.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have clearly explained the role on my team to every team member.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
During the team's first meeting, some time was dedicated to team building exercises such as meeting individual team members, creating effective team communications, and/or discussing conflict resolution.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Team members were asked for their suggestions when the team was originally formed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knowledge and information sharing is understood to be a group norm within my team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

E-leadership Communication Scale

13. In the virtual context, the ability to achieve effective communication patterns is essential to the success of virtual team functioning. As a virtual team leader, circle the number that best indicates where you fall in the scale. 5: *strongly agree*; 1: *strongly disagree*

	5	4	3	2	1
I communicate with my team members in a frequent, ongoing manner, and constantly send feedbacks to them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When having created a vision, I share the vision to all team members and ensure everyone understand and believe to be achievable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Through communication, I know my followers' capabilities, and I have a great understanding of my team members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive and communicate group thinking patterns back to the members, for the best decision to be made.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Individuals are encouraged to take initiative and participate in important decisions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am competent with and serve as positive role models in the use of communication.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The team is equipped with adequate tools and technologies to perform our tasks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The electronic methods we use to communicate with one another are effective.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section 4. Trust

14. Based on your experience, which trust do you think is most important for team performance, trust from members in team leader, trust from leaders in members, or trust among team members?

- ☐ Trust from members in team leader
- ☐ Trust from leaders in members
- ☐ Trust among team members

15. Which leadership style do you conduct, transformational or transactional?

Transformational Leadership: inspire followers to share the leader's values and connect with the leader's vision, and the followers giving their trust in return.

Transactional Leadership: based on a transaction or exchange of something of value the leader possesses or controls that the follower wants in return for his/her services.

- ☐ transformational
- ☐ transactional
- ☐ mixture of both
- ☐ Neither (specify)

Section 5. Conflict

16. According to scholars, the conflicts in virtual team mainly stem from Communication barriers, Cultural differences, Age diversity, and Gender diversity. Cultural Diversity includes national and linguistic differences among members. Based on your empirical experience, which one among these diversities causes most of conflicts in your team? (You can also specify your own opinion)

- ☐ Communication Barriers
- ☐ Cultural Difference (Linguistic differences)
- ☐ Cultural Difference (National differences)
- ☐ Age Diversity
- ☐ Gender Diversity
- ☐ none of above (specify)

17. Focus on your answer to previous question. Can you identify a typical Example of conflicts in your team caused by the specific diversity you selected in previous question?

Section 6. Epilogue

18. Is there an effective training program within your company to train employees to improve capability of working under the virtual environment? If yes, then could you describe about those training programs?

- ☐ No
- ☐ Yes (describe)

19. Is there an effective training program within your company to train managers to improve leadership qualities? If yes, then could you describe about those training programs?

- ☐ No
- ☐ Yes (describe)

APPENDIX 3. Survey for Follower

On-line Survey for Virtual Team Members

Section 1. Basic Information

1. Gender:

- ☐ Male
- ☐ Female

2. Nationality:

3. The virtual team you participated/are participating mainly focuses on:

- ☐ Product Development & Design
- ☐ Performance Testing
- ☐ Manufacture Development
- ☐ Marketing & Sales
- ☐ Customer Services
- ☐ Management & Administration
- ☐ Information Integrity
- ☐ Consultation
- ☐ Other (specify)

4. Number of team members:

5. The coalition of your virtual team is:

- ☐ Temporary
- ☐ Permanent

6. In your virtual team, have the team members been changed?

- ☐ Original members are not changed.
- ☐ Only a minority of members are changed.
- ☐ Almost half of original members are replaced.
- ☐ Majority of members are changed.
- ☐ All the members have been changed.

Section 2. Information and Communication Technology (ICT)

7. Among the following technology tools, which three technology tools do you use most frequently and commonly? Number 1, 2, 3 to rank them.

<input type="text"/>	E-mail	<input type="text"/>	Wikis
<input type="text"/>	Telephone Call	<input type="text"/>	Weblogs
<input type="text"/>	Voice Mail	<input type="text"/>	RSS
<input type="text"/>	Fax	<input type="text"/>	Web Services
<input type="text"/>	On-line Chat	<input type="text"/>	Social Bookmarking
<input type="text"/>	Video Conference	<input type="text"/>	Flash Meeting
<input type="text"/>	Group Telephone Conference	<input type="text"/>	On-line Whiteboard
<input type="text"/>	Standard/Express Mail Delivery	<input type="text"/>	Application/desktop Sharing
<input type="text"/>	Internet Forum/Discussion Boards	<input type="text"/>	Task Lists
<input type="text"/>	Intranet	<input type="text"/>	Mind maps
<input type="text"/>	Extranet	<input type="text"/>	File and Documents Sharing
<input type="text"/>	Web 2.0	<input type="text"/>	Semantic Web
<input type="text"/>	Other (specify):		

8. Do you use Video Conferencing to communicate with other team member? If so, how often do you use video conferencing to organize online meeting?

- ☐ Once a week
- ☐ Once to twice a week
- ☐ Once every two weeks
- ☐ Once a month
- ☐ Seldom
- ☐ Never
- ☐ Other (specify)

9. Do you ever feel Email or Video Conference limits your ability to effectively communicate with other team members? Please determine the effectiveness of email and video conference, respectively. *10- highly effective, no limits; 1- not effective, always limit my ability.*

	10	9	8	7	6	5	4	3	2	1
Email	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Video Conference	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. To what extend do you think face-to-face meeting is necessary for virtual team relationship building? *10-very necessary; 1-very unnecessary.*

	10	9	8	7	6	5	4	3	2	1
Face-to-face Meeting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section 3. Communication in Virtual Team

Virtual Team Formation

11. The following questions mainly focus on specific information about how your virtual team was formed. *5: strongly agree; 1: strongly disagree.*

	5	4	3	2	1
All the team members were selected based on their individual talents and abilities to contribute to the team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When selected, team members were technically competent with the technology tools we use to perform our work and interact with one another.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leader has provided sufficient information to team members in order to let us understand the team's purpose.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leader has clearly explained the role on his team to every team member.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
During the team's first meeting, some time was dedicated to team building exercises such as meeting individual team members, creating effective team communications, and/or discussing conflict resolution.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Team members were asked for their suggestions when the team was originally formed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knowledge and information sharing is understood to be a group norm within my team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

E-leadership Communication Scale

12. In the virtual context, the ability to achieve effective communication patterns is essential to the success of virtual team functioning. As a virtual team member, circle the number that best indicates where you fall in the scale. 5: *strongly agree*; 1: *strongly disagree*.

	5	4	3	2	1
The leader communicates with team members in a frequent, ongoing manner, and constantly sends feedbacks to us.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When having created a vision, the leader shares the vision to all team members and ensure everyone understand and believe to be achievable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Through communication, the leader knows our capabilities, and has a great understanding of team members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leader perceives and communicates group thinking patterns back to the members, for the best decision to be made.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Individuals are encouraged to take initiative and participate in important decisions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leader is competent with and serves as positive role models in the use of communication technologies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The team is equipped with adequate tools and technologies to perform our tasks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The electronic methods we use to communicate with one another are effective.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section 4. Trust in Team Leader

13. The following questions mainly focus on how much do team members trust on their team leader. Based on team member feedbacks, please circle your opinion towards the following statements. 5: *strongly agree*; 1: *strongly disagree*.

	5	4	3	2	1
With special knowledge or skills, the leader's ability and preparation for work is unquestionable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We believe the leader will not cause any errors or mistakes due to carelessness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We believe the leader will keep his promise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We feel frustrated if the leader is resigned or we cannot work with him anymore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If sharing our issue with the leader, we will get his constructive suggestions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leader attempts to manage the relationship and friendship in our team with all his efforts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We can set our heart at rest when the leader is supervising the whole progress of project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We trust the leader.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. Based on your experience, which trust do you think is most important for team performance, trust from members in team leader, trust from leaders in members, or trust among team members?

- ☐ Trust from members in team leader
- ☐ Trust from leaders in members
- ☐ Trust among team members

15. The following questions mainly focus on the leadership style in your virtual team. Based on your observation on interaction between team leader and other team members, please determine how frequently the following behaviors happen.

	<i>never</i>	<i>seldom</i>	<i>sometimes</i>	<i>often</i>	<i>always</i>
The leader evokes our enthusiasm for our team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leader understands our requirements, and helps meet them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leader appreciates and commends us for what we have achieved.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leader encourages us to consider certain issue from different angles and tackle difficulties by new approaches.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
With concise words, the leader shows his expectation on us.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When we have achieved the projected goal, the leader will give us reasonable rewards.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leader makes a deal with us: in order to get rewards, we have to fulfill something.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We can ask the leader for rewards when we have done a great job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leader determines to give rewards or punishments according to our performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section 5. Conflict

16. According to scholars, the conflicts in virtual team mainly stem from Communication barriers, Cultural differences, Age diversity, and Gender diversity. Cultural Diversity includes national and linguistic differences among members. Based on your empirical experience, which one among these diversities causes most of conflicts in your team? (You can also specify your own opinion)

- ☐ Communication Barriers
- ☐ Cultural Difference (Linguistic differences)
- ☐ Cultural Difference (National differences)
- ☐ Age Diversity
- ☐ Gender Diversity
- ☐ none of above (specify)

17. Focus on your answer to previous question. Can you identify a typical Example of conflicts in your team caused by the specific diversity you selected in previous question?

Section 6. Epilogue

18. Is there an effective training program within your company to train employees to improve capability of working under the virtual environment? If yes, then could you describe about those training programs?

- ☐ No
- ☐ Yes (describe)

19. Is there an effective training program within your company to train managers to improve leadership qualities? If yes, then could you describe about those training programs?

- ☐ No
- ☐ Yes (describe)